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In the Supreme Court of the United States

OCTOBER TERM 1960.

No. 184.

FLOYD A. FIRESTONE,

Petitioner,

and

SPERRY PRODUCTS, INC. and
UNITED AIRCRAFT CORPORATION,

Involuntary Petitioners,

vs.

ALUMINUM COMPANY OF AMERICA,
ELECTRO-CIRCUITS INC. and
CURTISS-WRIGHT CORPORATION,

Respondents.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SIXTH CIRCUIT.

PETITION FOR A WRIT OF CERTIORARI

To the United States Court of Appeals for the Sixth Circuit.

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TABLE OF CONTENTS.

PETITION FOR A WRIT OF CERTIORARI 1

Opinions Below 4

Jurisdiction 4

Questions Presented for Review 4

Statutes Involved 5

Statement of the Case 7

Argument 9

Reasons for Allowance of the Writ 9

First Question 11

Second Question 12

Third Question 15

Fourth Question 18

APPENDIX (Attached):

Opinion of the United States Court of Appeals for the Sixth Circuit 1a

Judgment 32a

Petition for Rehearing of Floyd A. Firestone 33a

Justification for Filing This Petition Without Joinder Therein by Sperry 33a

Grounds for This Petition 35a

Novelty, Lack of Anticipation by the Prior Art. Infringement 47a

Conclusion of Petition 47a

Certificate 48a

Brief in Support of Petition 49a

Invention Is a Question of Fact 49a

Reference Addendum 50a

Invention. Unobviousness of the Patent No. 2 Invention Over the Patent No. 1 Invention 50a

Order Denying Petition for Rehearing 55a

TABLE OF AUTHORITIES.

Cases.

Cuno Corp. v. Automatic Devices Corp., 314 U. S. 84 ..9, 19

Eibel Process Co. v. Minnesota & Ontario Paper Co., 261 U. S. 63 19

Great Atlantic and Pacific Tea Co. v. Supermarkets Eq. Corp., 340 U. S. 147 .....9, 20

Statutes.

28 U. S. C. 1254(1) 4, 6

28 U. S. C. 2101 ..... 4, 6

35 U. S. C. 101 .....5, 10, 18

35 U. S. C. 103 .....4, 5, 6, 9, 12, 13, 18, 19, 20

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To the United States Court of Appeals for the Sixth Circuit.

Petitioner together with Sperry Products, Inc. and United Aircraft Corporation, sued respondents for infringement of four Letters Patents to the United States, as follows:

Patent 1: 2,280,226 Issued April 21, 1942—for Flaw Detecting Device and Measuring Instrument (847a)

Patent 2: 2,398,701 Issued April 16, 1946—for Supersonic Inspection Device (855a)

Patent 3: 2,467,301 Issued April 12, 1946—for Supersonic Inspection for Flaws lying near the surface of a part (865a)

Patent 4: 2,592,134 Issued April 8, 1952—for Method of Supersonic Inspection (869a)

Petitioner is the inventor of the inventions set forth in each of the aforesaid patents, and was co-plaintiff in the District Court with Sperry Products, Inc., and United Aircraft Corporation. Petitioner is the owner of legal title to Patent No. 1. Sperry Products, Inc., a New York Corporation, is his exclusive licensee in all fields except airplane propellors, under Patent No. 1, as well as the owner of Patents Nos. 3 and 4. United Aircraft Corporation, a Delaware Corporation, is the owner of Patent No. 2 and was brought into the action involuntarily. Petitioner, Floyd A. Firestone, is also the exclusive licensee from United under Patent No. 2 in all fields except aeronautical and Sperry Products, Inc. is exclusive sub-licensee under Floyd A. Firestone in all fields except aeronautical. Sperry as sub-licensee has the right of cancellation upon 30 days' notice. Sperry is also exclusive licensee under United in Patent No. 2 in aeronautical fields and in Patent No. 1 in the airplane propellor field, except for a license reserved to United in such fields.

The District Court for the Northern District of Ohio held Claims 2, 3, 4, 10 and 11 of Patent No. 1 to be valid and infringed. That decision was affirmed by the Court of Appeals.

The District Court held Claim 7 of the Patent No. 2 to be invalid, but infringed if valid. The Court of Appeals

reversed the decision of the District Court and held Claim 7 to be valid and infringed.

The District Court held Claims 16, 19, 20, 25, 26, 29 and 32 of Patent No. 2 to be valid and infringed, but the Court of Appeals held that such claims are invalid over the disclosure in the No. 1 patent. The question of infringement was not discussed in the opinion of the Court of Appeals, and was not discussed in Briefs of Counsel for Defendants in the Court of Appeals. Presumably, therefore, the reversal by the Court of Appeals of the holding of the District Court on infringement was only predicated on the proposition that there can be no infringement of invalid claims.

In the District Court Claims 1, 2 and 3 of Patent No. 3 were held to be valid and infringed. Such holding was affirmed by the Court of Appeals.

In the District Court Claim 2 of Patent No. 4 was held to be valid and infringed and such finding was affirmed by the Court of Appeals.

The present petition is concerned only with the decision of the Court of Appeals, on the question of validity of Claims 16, 19, 20, 25, 26, 29 and 32 of Patent No. 2.

The present Petition is brought by Petitioner, Floyd A. Firestone in his own behalf. Sperry Products, Inc. and United Aircraft Corporation are added as involuntary Petitioners due to their respective exclusive interests in the No. 2 patent.

PETITIONER THEREFORE PRAYS, that a Writ of Certiorari issue to review the judgment of the United States Court of Appeals for the Sixth Circuit, holding Claims 16, 19, 20, 25, 26, 29 and 32 of Patent No. 2, namely No. 2,398,701, to be invalid and reversing the decision of the District Court holding such claims to be valid and infringed.

OPINIONS BELOW.

The Memorandum Opinion of the District Court is reported at 171 F. Supp. 901, 904, and is printed at 771a.

The Opinion of the Court of Appeals is reported at 285 F. 2d 911 and is printed in the Appendix hereto at p. 1a.

The Judgment of the Court of Appeals is printed in the Appendix hereto at p. 32a.

Petitioner's Petition for Rehearing is printed in the Appendix hereto at p. 33a.

The Order denying the Petition for Rehearing is printed in the Appendix hereto at p. 55a.

JURISDICTION.

Jurisdiction of this Court is invoked under 28 U. S. C. Section 1254(1) and 28 U. S. C. 2101. The judgment of the Court of Appeals was entered on November 22, 1960. The Order denying the Petition for Rehearing was entered June 1, 1961.

QUESTIONS PRESENTED FOR REVIEW.

First Question.

Must an Appellate Court, in reversing a finding of material fact, direct its attention to those facts?

Second Question.

Has an Appellate Court failed to follow the standard of invention of Section 103 of the Patent Act of 1952 where the Appellate Court holds lack of invention because an electronics element is old, irrespective of the fact that petitioner discovered, utilized, and disclosed a new and useful *property* of the element; and where the court's conclusion, in overruling the District Court, is based upon a statement taken out of context?

Third Question.

Where a patent sets forth several useful contributions in the ultrasonic flaw detection art, including the disclosure of a revolutionary discovery of a hitherto unknown property of a basic electronic element, which will in the future have broad usefulness in many other arts, and including the disclosure of a significant improvement in electro-acoustical transducer design, and where the District Court found such contributions to be useful, may the Court of Appeals reverse such finding, by ignoring such usefulness and, instead, base its reversal upon a scientific deduction, which lacks foundation in any of the testimony before the District Court, and in so doing base its conclusion upon a scientific error?

Fourth Question.

Has Section 103 of the Patent Act of July 19, 1952, Title 35 U. S. C. changed Section 101 thereof, so that the standard of invention as applied to an improvement in a highly technical electronic apparatus of great public interest precludes the grant of a valid patent, particularly where the improvement includes, in part, the discovery and disclosure of a new scientific principle and where each of the claims contains one or more new elements which perform in the combination a function different from that performed outside the combination?

STATUTES INVOLVED.

Patent Act of July 19, 1952, Title 35 U. S. C. Sec. 101.

"Inventions patentable:

"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title. (R. S. 4886; 35 U. S. C., 1946 ed., 31.)"

Patent Act of July 19, 1952. Title 35 U. S. C. Sec. 103:

"A patent may not be obtained though the invention is not identically disclosed or described as set forth in Sec. 12 of this Title if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made. July 19, 1952, c. 950 Sec. 1, 66 Stat. 797."

Act of June 25, 1948, c. 646, 62 Stat. 928 (28 U. S. C. Sec. 1254).

Sec. 1254 Court of Appeals; Certiorari; Appeal; Certified Questions.

Cases in the courts of appeals may be reviewed by the Supreme Court by the following methods.

(1) By writ of certiorari granted upon the petition of any party to any civil or criminal case, before or after rendition of judgment or decree.

Act of June 25, 1948, c. 646, 62 Stat. 961; May 24, 1949, c. 139. Sections 106, 63 Stat. 104. (28 U. S. C. Sec. 2101.)

Sec. 2101 S. Ct.: Time for appeal or certiorari; docketing; stay.

(c) Any other appeal or writ of certiorari intended to bring any judgment or decree in a civil action, suit or proceeding before the Supreme Court for review, shall be taken or applied for within 90 days after the entry of such judgment or decree.

STATEMENT OF THE CASE.

The District Court has aptly described the subject matter of the invention as follows (772a):

> "The devices described by the patent in suit which are sold under the trade name 'Reflectoscope' are instruments that use the pulse echo ultrasonic method in the detection of flaws in metal parts. By this method ultrasonic sound waves having a higher frequency than that audible to the human ear and capable of penetrating solid, liquid or gaseous material are propagated into a metal part. The waves travel through the part at a known speed of propagation characteristic of the material of the part under inspection. When the waves reach the opposite end of the part or when they encounter discontinuities or flaws therein their echos are reflected back to the face of the part. The reflections from flaws nearest the entering end of the part arrive at that point before the reflections from discontinuities farther away and sooner than the reflections from the opposite end of the part. As these various reflections reach the entering end of the part they are amplified and by means of a sweeping motion of a beam of cathode rays they are registered on a cathode ray oscilloscope in a manner that permits the determination of the time of travel of the waves and the location of flaws in the part. In order to measure accurately the time of travel of the waves to and from the reflecting surfaces, it is necessary to propagate them in short bursts or pulses to permit the reception of the reflected echo prior to the propagation of a subsequent pulse, hence the term 'pulse echo'."

The invention has gone into wide spread commercial use and is a revolutionary concept in the art of nondestructive testing, for the detection of flaws and for measurement. The value of the invention has been recognized by the acceptance of licenses under the patent.

As indicative of the recognition of Petitioner, the District Court found (791a):

"That Firestone was the first to invent an apparatus capable of inspecting solid parts for flaws by the timing of echos therefrom and measuring such parts by the timing of echos from the opposite side of a part is beyond question. Witness after witness for the defendants attested to the priority and highly meritorious performance of the devices manufactured under the Firestone patents. The Firestone invention was described in most laudatory terms in respected scientific publications and unquestionably it filled a long felt need. Dr. Firestone's achievement may be viewed in its true light by comparing it with the unsuccessful efforts of others, notably the research staff of the General Electric Company."

Petitioner having been the inventor of the invention disclosed in Patent No. 1, discovered that there were limitations in the use of an apparatus made according to such invention. Specifically, the Patent No. 1 apparatus could not in routine commercial inspection detect flaws closer to the sending point than a certain limiting distance when using sound wave frequencies low enough to simultaneously detect flaws far from the sending point. Such distance limitations fall within the confines of the sizes of parts tested for hidden flaws, in which the public has a great concern, for example, in the detection of fatigue cracks which develop near the surface of aeronautical parts, railroad car axles, rails, etc., and in the testing of rocket propellants for interior voids. Such testing is currently part of daily routine inspection by means of apparatus embodying the invention of the No. 2 patent.

Specifically the District Court found both the damping, and heterodyne amplifying elements, to be new in the art and that invention existed in the combination of these elements.

The Appellate Court reversed the finding that the elements were new and that invention existed in the combination thereof.

ARGUMENT.

Reasons for Allowance of the Writ.

The present questions are of public interest as the invention constitutes an improvement in an apparatus for detecting fatigue cracks and other structural defects which develop during the operation of rockets, trains, airplanes, and aeronautical parts and materials. One use of the device is in the inspection of solid rocket propellants. In this field limitations in inches in the degree of flaw detection are measured in terms of human life or the success of a mission. A further value of the device is that the invention thereof resulted in the discovery of a new property of a basic electronic element. It is in the public interest that the patent system operate to stimulate the invention and disclosure of scientific improvements in such a critical field.

In furtherance of that objective it is in the public interest that the Supreme Court provide a guide for the Appellate Courts in the disposition of cases involving complex electronics cases of interest to the national defense, safety, and welfare, or the advancement of science.

The recent Supreme Court decisions involved simple mechanical devices. In the *Great Atlantic and Pacific Tea Co. v. Supermarkets Eq. Corp.*, 340 U. S. 147, the invention related to a device for moving groceries along a counter. In *Cuno Corp. v. Automatic Devices Corp.*, 314 U. S. 84, a cigarette lighter was in question. Since these decisions were rendered, Section 103 of the Patent Act of 1952 has been enacted by Congress setting forth the standard of invention. This Section has not yet been construed by the Supreme Court. It is to be noted that the *Cuno* case relied on by the Appellate Court involved the "flash of genius" test.

If the Appellate Court continues to follow the trend of decisions of simple mechanical cases in cases of scientific or national welfare importance, the intent of Congress and the purposes of the patent system will be thwarted. The incentive to invent improvements in such critical areas will be seriously curtailed and inventors will be induced to keep their improvements secret or even to abandon them on the theory that the Courts uphold only pioneer patents and that there is no need to direct efforts towards improvements therein. Yet Section 101 of the Patent Law clearly provides for the reward of a patent for new and useful machines or *improvements* thereon. There was no intent of Congress to give improvements a second class status.

It is further requested that this Court exercise its supervisory powers to correct errors of procedure. The Appellate Court, in overruling the findings of fact of the lower Court, indicated that it did not fully understand the scientific principles with which it was concerned, and thereby committed scientific as well as judicial error in relying on statements of witnesses taken out of context and on statements of witnesses as to legal conclusions as though such statements were as to fact.

FIRST QUESTION.

1. Must an Appellate Court in reversing a finding of material fact direct its attention to those facts?

The Appellate Court (Appendix hereto p. 12a) dismissed the finding of fact of the Trial Court (771a) as follows:

> "It is known that crystal damping was in use before Dr. Firestone's adaptation of it in patent No. 2 (Fishleigh 325a)."

The statement of Mr. Fishleigh upon which the Appellate Court relied appears in the testimony (325a) as follows:

> "Q. * * * Was this Firestone patent the first disclosure of this idea of damping to free oscillations of a crystal or other vibrating members?
>
> A. Oh, no, that was old. Quite well known long prior to Firestone.
>
> Q. Have you made a selection of references showing the fact that this idea was old and put excerpts from those references on a chart?
>
> A. Yes, I have.
>
> The Court: I think we'll suspend at this time.
>
> (Adjournment taken to 10:00 A. M. on Thursday, February 27, 1958)."

The Trial Court discussed in detail the prior art which allegedly showed backside crystal damping as being old and found such contention to be without merit. (793a.)

It is respectfully submitted that it is error for an Appellate Court in a complicated electronic case to decline to examine the facts, but to defer instead to the judgment of an adverse witness thereon. It is further submitted that this error is material and harmful where grounds for reversal would not exist, but for the reversal of the finding of fact. If the concept of the use of backside crystal damping is new, then claims 19 and 32 are valid. More-

over, claims which include such damping in combination, such as claims 20 and 26 are likewise valid.

SECOND QUESTION.

Has an Appellate Court failed to follow the standard of invention of Section 103 of the Patent Act of 1952 where the Appellate Court holds lack of invention because an electronics element is old, irrespective of the fact that petitioner discovered, utilized, and disclosed a new and useful PROPERTY of the element; and where the court's conclusion, in overruling the District Court, is based upon a statement taken out of context?

Section 103 of the Patent Act of 1953 causes invention to turn on the obviousness of the use of an element to one skilled in the art. Prior to Petitioner's invention it was not known that a heterodyne amplifier having an intermediate frequency higher than the signal frequency had rapid sensitivity recovery. Thus one skilled in the art would have to perform an act of invention himself to utilize this element in the flaw detection art. The Appellate Court ignored this fact and overruled the Trial Court merely because heterodyne amplifiers were old in *other* arts although the *characteristic* discovered by Petitioner which gave Petitioner his inventive results was *not* known in the other arts.

The Trial Court stated the problem as follows in its Opinion (796a):

> "* * * The 'blocking' to which Firestone refers is the paralysis which overtakes an amplifier irrespective of its band width when the amplifier is overloaded by a signal of too high amplitude. The powerful thrust of the input signal of Firestone's device resulted in paralysis or loss of sensitivity of the amplifier. Firestone was therefore confronted with the

problem of providing an amplifier which would recover its sensitivity within approximately one millionth of a second so that it would be sensitive to the feeble train waves reflected back to the crystal from flaws distant only a fraction of an inch from the sending point."

The Trial Court summarized the invention in claims 16, 25 and 29 as follows in its Opinion (797a):

> "* * * Firestone did more than merely recognize a feature or advantage of a heterodyne amplifier as used in the depth sounding art. He used the heterodyne amplifier in the different art of non-destructive testing by the new technique of the ultra-sonic pulse echo method *to effect the novel and useful result of enabling the receiver speedily to recover its sensitivity and reflect the echoes from flaws close to the surface of the piece under inspection.* Thus, by the use of imagination and inventive skill, Firestone adapted an old device to a new use in a different art and achieved an unobvious and useful result. The principle applicable here was well stated in Potts v. Creager, 155 U. S. 597, 607, where it was said:
>
> 'Indeed it often requires as an acute perception of the relation between cause and effect, and as much of the peculiar intuitive genius which is the characteristic of great inventors, to grasp the idea that a device used in one art may be made available in another, as would be necessary to create the device de novo.' " (Emphasis added.)

It is apparent that the Appellate Court in ignoring the necessity of discovery of a new characteristic of an element in order to carry out the invention herein, applied a different standard of invention than that of "obviousness" to one skilled in the art of Section 103 of the Patent Act of 1952.

It is to be noted that Petitioner's invention in claims 16, 25 and 29 was twofold: (1) the discovery that failure

to detect flaws near the surface was due to the failure of an amplifier to recover sensitivity to small voltages in one millionth of a second and (2) the discovery that a particular construction of amplifier had this characteristic. Neither branch of the solution was "obvious" to one skilled in the art.

Not only did the Appellate Court fail to follow the standard of invention of Section 103 of the Patent Act, but in overruling the trial Court the Appellate Court committed judicial error in taking a statement out of context. The Appellate Court bases its overruling of the novelty of the amplifying element *solely* on the alleged "concessions" of Dr. Firestone.

The Appellate Court, at page 9 of its Opinion, dismisses the problem of the heterodyne amplifier as follows:

> "* * * and he concedes that the heterodyne amplifier was old in the art before he used it in his patent."

The Court then quotes the testimony of Dr. Firestone to support its position. The Appellate Court's error is apparent on the face of the quotation on which it relies. The Court quotes, at page 10 of the Opinion, Dr. Firestone's statements at pages 546 and 547 of the record as follows:

> "At pages 546 and 547a: 'I concede right off that there have been used before my invention heterodyne amplifiers having intermediate frequencies higher than the signal frequency. But they were always used for announced purposes which were different than my purpose, and *none of them taught what I discovered, that a heterodyne amplifier with such elevated intermediate frequency will recover its sensitivity after the initial shock more rapidly than will a straight amplifier,* and Wiseman is one example of such an amplifier. And if there has not been such teaching in the past literature, one does not know enough to choose such an amplifier in the design of

his apparatus. I was the first to announce that such a heterodyne amplifier will recover its sensitivity more rapidly than a straight amplifier.' " (Emphasis added.)

It is apparent that the very testimony relied on by the Court as a "concession" sets forth the newly discovered *property* which was overlooked by the Court of Appeals in relying on Dr. Firestone's assertion that the *device* was old. Moreover, the "concession" is that heterodyne amplifiers are old in other arts *not* that they are old in the pulse-echo flaw detection art.

THIRD QUESTION.

Where a patent sets forth several useful contributions in the ultrasonic flaw detection art, including the disclosure of a revolutionary discovery of a hitherto unknown property of a basic electronic element, which will in the future have broad usefulness in many other arts, and including the disclosure of a significant improvement in electro-acoustical transducer design, and where the District Court found such contributions to be useful, may the Court of Appeals reverse such finding, by ignoring such usefulness and, instead, base its reversal upon a scientific deduction, which lacks foundation in any of the testimony before the District Court, and in so doing base its conclusion upon a scientific error?

The Trial Court found that Petitioner, by the use of "imagination and inventive skill," achieved "an unobvious and useful result." The Appellate Court reversed the finding of utility. The Appellate Court found that the combination of a particular form of heterodyne amplifier when used with a damping of a crystal "resulted in detecting flaws closer to the surface than could be done with patent No. 1." The Court then characterized such utility

as being merely a matter of degree. In making such a conclusion the Court extracted excerpts from the testimony and in so doing committed several instances of scientific error and ignored the discovery of a new physical principle having utility beyond the scope of Petitioner's claims.

In relying only upon a portion of the statement of Dr. Firestone at page 186a with respect to flaw detection, the Court committed grave scientific error. The Appellate Court relied upon a portion of a statement of Dr. Firestone taken out of context as proof that the flaw detecting capabilities of patents Nos. 1 and 2 were identical. The Appellate Court stated as follows:

> "The questions arise from Dr. Firestone's own testimony whether he even achieved any new result * * * in detection of flaws he said: 'approximately a half an inch, or inch, perhaps' (186a)."

The testimony at page 186a in *context* was as follows:

> "Q. But so far as detection of flaws, what would you say was the case with your first patent?
>
> A. Approximately a half an inch, or inch, perhaps.
>
> Q. Perhaps an inch?
>
> A. *Depending on the frequency in use.*" (Emphasis added.)

The Appellate Court in relying upon the statement of Dr. Firestone completely ignored the qualification as to frequency. The difference in frequency is extremely important as with patent No. 1 it was necessary to utilize *high* frequencies to detect surface flaws, whereas the invention of patent No. 2 permitted the use of very low frequency. The difference is substantial. As stated by *Defendant's* expert, William C. Hitt (453a):

> "The detection of flaws in dry propellant used in missiles *requires a very low frequency* for penetration." (Emphasis added.)

Thus it is seen that the invention of patent No. 2 is very useful indeed where dry propellant for missiles is concerned. The device permitted flaw detection therein which was impossible by patent No. 1 in view of the low frequency requirement. Yet the Appellate Court makes no such distinction.

An additional advantage of the No. 2 Patent, which depends on the frequency advantage, and which consequently was overlooked by the Appellate Court, is that a single placement of the crystal will serve to detect flaws both close to and far from the sending point. (75a, 76a, 185a, 186a, 188a, 189a.)

The Appellate Court committed further scientific error in failing to distinguish between measuring thickness of an object and detecting flaws therein. The Appellate Court stated as follows:

> "The utility of patent No. 2 lies in the claim of Dr. Firestone that he had invented a means of detecting flaws in metal closer to the surface—within one-half inch."

The Court then immediately discusses the ability to *measure* one-sixteenth of an inch in support of its statement about flaw detection. The record shows that finer measurements of the thickness of an object are easier to make than are the detection of flaws, i.e. inhomogeneities that indicate a structural defect. The difference is also apparent from the Opinion. In the excerpts from the record "one-half inch" is the dimension utilized in referring to flaw detection, whereas "one-sixteenth inch" is the dimension utilized where measurement is being considered. The Appellate Court's finding that both devices were capable of

measuring one-sixteenth inch is irrelevant when compared to flaw detection. As stated by the Appellate Court, the utility of the patent lies in flaw detection. It is the advance in flaw detection that determines whether or not a train is derailed, or a rocket functions properly.

It is to be noted further that, with respect to utility, the Appellate Court makes no comment on the discovery of a new physical property of a basic electronic element, namely, that a heterodyne amplifier having intermediate frequency higher than the signal frequency was capable of *rapid sensitivity recovery* after subjection to a profound voltage shock. It is submitted that it is error for an Appellate Court to ignore the contribution to science by the discovery of a new property of a known element and the stimulation to further discoveries in the field which is generated thereby. It is the purpose of the patent system to grant the reward of a patent for the disclosure and utilization of a new principle.

FOURTH QUESTION.

Has Section 103 of the Patent Act of July 19, 1952, Title 35 U. S. C. changed Section 101 thereof, so that the standard of invention as applied to an improvement in a highly technical electronic apparatus of great public interest precludes the grant of a valid patent, particularly where the improvement includes, in part, the discovery and disclosure of a new scientific principle and where each of the claims contains one or more new elements which perform in the combination a function different from that performed outside the combination?

Section 101 of the Patent Act provides that a patent may be granted for any new and useful process, machine, manufacture, or composition of matter, "*or any new and*

useful improvement thereof." Improvement inventions are given equal status with pioneer inventions. Section 103 of the Patent Act of 1952 sets forth the standard of invention and makes no distinction between the two kinds of invention.

It is submitted that the doctrine of *Eibel Process Co. v. Minnesota & Ontario Paper Co.*, 261 U. S. 63, referred to by the trial Court (798a) is valid today. An improvement of a modern machine and process, if it is meritorious, is as much entitled to a patent as is a pioneer invention.

If, at the time of Justice Taft, an improvement was deemed to be of value, how much more so is it today where the improvement is in an electronic device for detecting flaws in solid rocket propellants and airplanes and where it unveils a new characteristic of a basic electronic element.

Questions 1, 2 and 3 herein point out the errors of the Appellate Court in treating the individual elements and the utility of the invention. The arguments thereunder, it is submitted, indicate that the Appellate Court lacked sufficient grounds for overruling the lower Court's finding that the invention was meritorious and that the Appellate Court committed errors of science and procedure in overruling such findings.

Suffice it here to say that the present case presents a clear basis for examining Section 103 of the Patent Act of 1952 and for guiding the lower Courts against applying the principles of simple mechanical cases to complex electronics cases of importance to scientific advancement and the national safety and welfare. Each of the cases cited by the Appellate Court at page 12 of its Opinion related to simple mechanical improvements, and not to an invention of the scientific complexity and merit as is found in the case at bar. Moreover, since the present case relies on *Cuno Corp. v. Automatic Devices Corp.*, 314 U. S. 84,

91, an opportunity is provided for an interpretation of the "flash of genius" test contained therein, as applied to electronics cases in view of the subsequent enactment of Section 103 of the Patent Act.

Finally, it is to be noted that the Appellate Court did not properly apply the law of combination patents. Even if the damping and amplifying elements were old in the art, which they were not, the Court would have to determine that the *combination* thereof was old in order to hold the combination claims invalid. *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp., et al.*, 340 U. S. 147.

The Trial Court amply summarized the lack of anticipation of the combination by the prior art as follows (799a):

> "It is unnecessary to repeat the findings hereinabove made as to the alleged anticipation of the damping means and the heterodyne amplifier considered as separate elements. Defendants' argument that the combination is an old one is not supported by the references cited by them. *None of such references show the combination.*" (Emphasis added.)

The Appellate Court refers to no reference containing the entire combination. The Appellate Court's sole grounds for reversal of the finding as to validity of the combination is that the combination is anticipated by patent No. 1.

The Court stated at page 12 of its Opinion as follows:

> "The parts performed the same function and operated in the same way as they did in the original patent. The difference in result was one of degree. It was only a refinement such as one skilled in the art could have achieved from the disclosures of the first patent. This is not invention."

Such conclusion is clearly erroneous as *no damping means of any kind* is contained in patent No. 1 or even suggested. Moreover, the heterodyne amplifier of patent No. 2 performs an *additional function* beyond that of the amplifier of patent No. 1 in that when used in conjunction with a damping means, not suggested by patent No. 1, it recovers its sensitivity within a millionth of a second *thereby* enabling the apparatus to measure flaws within a half inch at low frequencies and thus to yield a new result that permits the testing of solid rocket propellants. Thus, assuming *arguendo* that the elements are old a mere inspection of patent No. 1 shows that the *combination* was new.

The Appellate Court states that the "difference in result was one of degree." When the "degree" means the difference in whether a flaw in a solid rocket propellant is detected, the "degree" is of great significance indeed and is not the kind of degree involved in the *Cuno* case *supra*, or similar cases involving simple mechanical developments.

For the foregoing reasons, it is urged that this petition for a writ of certiorari should be granted.

Respectfully submitted,

ALBERT R. TEARE,

Attorney for Petitioner.

Of Counsel:

TEARE, FETZER & TEARE.

June 23, 1961.

APPENDIX.

OPINION OF THE UNITED STATES COURT OF APPEALS FOR THE SIXTH CIRCUIT.

(Decided November 22, 1960.)

Before: McALLISTER, Chief Judge, MILLER and CECIL, Circuit Judges.

CECIL, Circuit Judge. This is an appeal from the District Court of the Eastern Division of the Northern District of Ohio. It involves infringement and validity of patents and a claim for damages and restraining orders asserted by counterclaim, for alleged misuse of patents through acts, contracts, combinations, conspiracies and monopolies all as set forth in the pleadings. The questions presented will be taken up and discussed seriatim.

There are four patents in suit: Nos. 2,280,226, 2,398,-701, 2,467,301 and 2,592,134. For convenience, they are referred to as patent numbers 1, 2, 3 and 4, respectively. The dates of the applications for and the issuance of these patents are as follows:

	Application	*Issued*
No. 1	May 27, 1940	April 21, 1942
No. 2	June 29, 1942	April 16, 1946
No. 3	July 23, 1945	April 12, 1949
No. 4	June 28, 1945	April 8, 1952

The plaintiffs and appellees are the following: Floyd A. Firestone, the inventor of all four patents and the owner of the legal title to No. 1; Sperry Products, Inc., a New York corporation, the exclusive licensee under patents Nos. 1 and 2, and the owner of patents 3 and 4; and United Aircraft Corporation, a Delaware corporation, and the owner of patent No. 2. This latter party was brought into the action involuntarily.

Aluminum Company of America, a Pennsylvania corporation, hereinafter called "Alcoa" is one of the defendants. It has a place of business in Cleveland, Ohio, where it used the accused device known as the "Immerscope." Electro Circuits, Inc., a California corporation, is another defendant and is the manufacturer of the Immerscope. Having no place of business in the jurisdiction of the court, it became a party by voluntarily filing an answer and counterclaim. Curtiss-Wright Corporation, a Delaware corporation, became a defendant on its own motion for intervention under order of the court dated February 10, 1959. Subsequent to October 17, 1955, it had manufactured certain Immerscopes under license from Electro Circuits. It is financing this litigation due to the inability of Electro Circuits to do so. All of these defendants are appellants on this appeal.

The parties will be referred to as plaintiffs and defendants, as they were in the trial court.

We will take up first the question of the validity of patent No. 1. (px 1, 849a.)

The claimed invention involves the principles of electronics and consists of the following elements or component parts: A device consisting of pulse oscillator, high frequency oscillator and modulator, to generate voltage trains, each containing one or more electric oscillations at supersonic frequency; a piezoelectric crystal to which the electric oscillations are applied and which crystal is acoustically coupled to the workpiece to be inspected via a medium (a film of oil or wax) having good conductive properties for ultrasonic vibrations; an amplifier, electrically connected to the crystal and capable of amplifying the weak electric oscillations produced in the crystal, by echo waves reflected from discontinuities within the workpiece; a linear sweep circuit synchronized with the generation of

the voltage trains applied to the crystal and a cathode ray tube whose beam is deflected by the linear sweep.

These components are all defined in the specifications of the patent.

The function of this apparatus as disclosed by the patent is for the inspection, exploration, and measurement of a solid part by means of supersonic vibration waves.

The operation of the apparatus consisting of these components may be explained in non-technical language as follows: An electric current is introduced into the pulse oscillator which causes it to emit rhythmic pulsations of current. Simultaneously an electric current is transmitted to a high frequency oscillator which is converted into a continuous high frequency current.

The output of these two components is conducted to the modulator which serves as an electronic valve. The rhythmic pulsations from the pulse oscillator open the valve for the duration of each pulse While open, the high frequency current passes through to the sending crystal. From the modulator then comes a rhythmic series of high frequency pulses, referred to as wave trains, which are transmitted to the sending crystal, causing it to produce mechanical vibrations at the same frequency as the current sent to it.

The high frequency mechanical vibrations or sound waves from the vibrating crystal are transmitted through a medium of oil or wax on the crystal into the solid part or workpiece being inspected.

When the sound waves strike a flaw or the end of the workpiece, referred to as a discontinuity, they are reflected as an echo back through the workpiece to the point at or near which they entered. This echo is picked up by the receiving crystal, which may be the same one as the send-

ing crystal or a different one, and the vibrations from the echo cause the receiving crystal to generate a small electric current. The current flowing from the receiving crystal is then increased in strength by an amplifier and conducted to a cathode ray oscilloscope, which is synchronized with the pulse of the oscillator, through a linear-sweep circuit.

When an electrical wave train is sent to the sending crystal, the linear-sweep circuit starts a spot of light moving horizontally across the fluorescent screen of the cathode ray tube at a constant speed.

The initial sound wave train deflects the spot. This deflection is referred to as a "pip." The spot then continues along its original path at the same speed, until the amplified current from the receiving crystal again deflects it, indicating that an echo has retur.. d from a discontinuity in the workpiece. If the discontinuity is a flaw, the pip will occur closer to the original pip on the oscilloscope screen than that caused by a reflection from the end of the workpiece. The distance between the deflections created by the original pulse and the echo indicate the distance the sound waves have traveled, because this distance is correlated to the time it takes the sound waves to go out from the sending crystal and be reflected back to the receiving crystal.

The same process occurs when the discontinuity is the end of the workpiece, but this deflection will be farther from the original pip due to the increased time of travel.

Thus a graphic illustration of the initial sound waves, those reflected from the opposite end of the workpiece and those reflected from any intervening flaws, is made to appear on the oscilloscope screen. The whole process takes place with great rapidity, perhaps 100 times per second, and because of persistence of vision, the light spot

on the oscilloscope screen appears as a stationary, continuous line.

Two basic questions challenging the validity of patent No. 1, which were argued by counsel for the defendants, in the trial court and determined by the trial judge, are here presented for review. These questions are 1, Floyd A. Firestone, the inventor, made a misrepresentation to the patent office in securing the allowance of the patent and 2, the claims in suit 2, 3, 4, 10 and 11 are lacking in invention over prior art and were anticipated by such prior art.

The defendants now raise, for the first time, questions concerning the sufficiency with which the structure or combination is defined in the claims in suit. This Court is not bound to consider such questions. "It is the usual rule that we will not give consideration to issues not raised below." *Doll v. Glenn*, 231 F. 2d 186, 190, C. A. 6; *Cold Metal Process Co. et al. v. McLouth Steel Corporation*, 170 F. 2d 369, 380, C. A. 6; *Helvering v. Wood*, 309 U. S. 344, 349.

In *Hormel v. Helvering*, 312 U. S. 552, 558, the court said: "These decisions and others like them, while recognizing the desirability and existence of a general practice under which appellate courts confine themselves to the issues raised below, nevertheless do not lose sight of the fact that such appellate practice should not be applied where the obvious result would be a plain miscarriage of justice."

No such result would obtain here. The validity of patent No. 1 can be determined by a consideration of the two basic questions mentioned above.

Further, we are of the opinion that the claims in suit, so far as sufficiency of statement is concerned, meet the requirements of the statute. Section 112 of the patent act, which became effective January 1, 1953, provides, in part,

"An element in a claim for combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof."

It was further provided that the Act should apply to unexpired patents granted before the effective date of the Act.

This statute is in a sense a codification of an existing practice, but, as stated in the commentary on the Act, "It is unquestionable that some measure of greater liberality in the use of functional expressions in combination claims is authorized than had been permitted by some court decisions, and that decisions such as that in *Halliburton Oil Well Cementing Co. v. Walker*, 67 S. Ct. 6, 329 U. S. 1, 91 L. Ed. 3 (1946) are modified or rendered obsolete, but the exact limits of the enlargement remain to be determined." p. 25 Title 35 U. S. C. A., Patents, Sections 1 to 110.

We consider that the elements of the combination constituting the claimed invention are sufficiently defined and described in the specifications to support the claims in suit as stated.

One of the claims of invalidity is based on a charge that Mr. Firestone, the patentor, made misrepresentations of fact to the patent office, which induced the allowance of the patent. Mr. Firestone stated in one of his responses to the patent office, after a rejection, that his device would measure distances as small as 1/16 inch. The defendants say that he purposely withheld the fact that he had been unable to measure a distance of 10 inches three months before the application was filed.

This defense was not made in the answers filed by the defendants. It was asserted after the trial judge, while

studying the case, called attention of the parties by letter to certain testimony which was not discussed in their briefs.

The trial judge ruled against the defendants on this issue. It is claimed by the defendants that in arriving at this conclusion the judge relied on an entry in a notebook of Mr. Firestone, which was not properly admissible. (px 54, 883a.) The page in question of the notebook had been admitted for another entry on another point.

This was a notebook which Mr. Firestone began using about August 1940. It was in his handwriting and contained entries of his work dated currently with the time of the entry. It was introduced for the entry dated January 10, 1941. This page also carried an entry dated November 2, 1940. It was this entry to which the trial judge made reference and which is objected to by the defense. The Court held that there was sufficient proof to allow its admission for the 1941 entry. If it were properly admitted for the one entry we see no reason why it cannot be considered for another similar entry of a different date. We think this exhibit was properly introduced under Section 1732, Title 28 U. S. C.

In *National Latex Products Company v. The Sun Rubber Co.*, 274 F. 2d 224, C. A. 6, cert. denied 362 U. S. 989, reports of the inventor were in evidence but there is no discussion of their admissibility. In *Erie R. Co. v. Lade*, 209 F. 2d 948, 951, C. A. 6, the Court said: "Rule 43(a), Federal Rules of Civil Procedure, 28 U. S. C., gives the court much latitude in determining admissibility of evidence and doubts must be resolved in favor of admissibility."

After reviewing all of the evidence on the subject of misrepresentation, we conclude that the facts as found by the trial judge are not clearly erroneous. The facts amply

support his conclusions: "I hold, therefore, that the representation of Dr. Firestone as to the 1/16 inch measurement was not fraudulently made and that under the circumstances such representation was not a material departure from the true measuring capability of patent No. 1." (171 F. Supp. 901, 908.) And at p. 910, 171 F. Supp.: "A fair analysis of the record leads to the conclusion that defendants have failed to sustain their claims of misrepresentation by that degree of clear and satisfactory proof required by law. I find that the presumption of the validity of patent No. 2,280,226 has not been impaired by misrepresentations to the patent office."

The statute gives a patent a presumption of validity. (Section 282 of Title 35 U. S. C.) This presumption is weakened if there is applicable prior art not considered by the patent office. *France Mfg. Co. v. Jefferson Electric Co.*, 106 F. 2d 605, C. A. 6; *Wolverine Fabricating and Mfg. Co., Inc. v. Detroit Gasket and Mfg. Co.*, 148 F. 2d 399, C. A. 6; *Modern Products Supply Co. v. Drachenberg*, 152 F. 2d 203, C. A. 6; *Cold Metal Process Company v. Republic Steel Corp.*, 233 F. 2d 828, C. A. 6; *Gibson-Stewart Company, Inc. v. Wm. Bros Boiler and Manufacturing Company*, 264 F. 2d 776, C. A. 6; *Murray Company of Texas, Inc. v. Continental Gin Company*, 264 F. 2d 65, C. A. 5.

Patent No. 1 now before us, if valid, must rest on the principle that it is a combination of old elements which accomplish a new and useful result. It is elementary that the elements requisite to the validity of a patent are novelty, utility and invention.

Judge McAllister, speaking for the Court in *Allied Wheel Products v. Rude*, 206 F. 2d 752, 760, C. A. 6, said: "Anticipation belongs in the field of novelty. To anticipate an invention is to negative novelty; but even though a patent is not anticipated, and is concededly novel, it may

lack invention. In order to anticipate an invention, it is necessary that all of the elements of the invention or their equivalents be found in one single description or structure, where they do substantially the same work in substantially the same way."

In *Ohmer Fare Register Co. v. Ohmer,* 238 F. 182, 186, C. A. 6, Judge Knappen, speaking for the Court, said: "We are cited to no reference in the prior art fully anticipating the patent in suit. But we are considering the scope of invention, not anticipation; and in such inquiry the question is one of fact, taking into account the entire prior art, whether the advance made in the given case amounts to invention or only mechanical skill. . . . All elements of the prior art have a bearing upon the question of invention; it being unnecessary to a finding of lack of invention that every element be found in one embodiment."

"A reference, in order to be effective to disprove the novelty of an alleged invention, must relate to the same art as the questioned invention or to an analogous or closely related art." *Allied Wheel Products v. Rude,* 206 F. 2d 752, 755, C. A. 6. "With regard to analogous art, it is the rule that, though an inventor is conclusively presumed to know the prior art in his own and clearly allied lines of endeavor, he is not bound by what has been done in remote or non-analogous arts." *Allied Wheel Products v. Rude,* supra, 755. See also: *Ottinger v. Ferro Stamping & Mfg. Co.,* 59 F. 2d 640, C. A. 6; *Alemite Mfg. Corp. v. Rogers Products Co., Inc.,* 42 F. 2d 648, C. A. 3.

In *A. J. Deer Co., Inc. v. United States Slicing Machine Co.,* 21 F. 2d 812, 813, C. A. 7, the court said: "We are of opinion that whether arts or uses are analogous depends upon the similarity of their elements and purposes. If the elements and purposes in one art are related and similar to those in another art, and because and by reason

of that relation and similarity make an appeal to the mind of a person having mechanical skill and knowledge of the purposes of the other art, then we are of the opinion that such arts must be said to be analogous, and, if the converse is true, they are non-analogous arts." See also *Allied Wheel Products v. Rude*, supra; *Copeman Laboratories Co. v. General Plastics Corp.*, 149 F. 2d 962, C. A. 7; *B and M Corporation v. Koolvent Aluminum Awning Corporation of Indiana*, 257 F. 2d 264, C. A. 7. Another test is stated in *General Metals Powder Co. v. S. K. Wellman Co.*, 157 F. 2d 505, 510, C. A. 6: "A reasonable test is, whether the art from which the citations against the patent were drawn, was so remote that students of the questioned art would not naturally have looked there for help."

Findings of fact of the trial court in a patent case cannot be set aside unless clearly erroneous. Rule 52, F. R. C. P.; *General Metals Powder Co. v. S. K. Wellman Co.*, supra; *Gibson-Stewart Company, Inc. v. Wm. Bros Boiler and Manufacturing Company*, supra; *Cold Metal Process Company v. Republic Steel Corp.*, supra.

With these principles in mind we now turn to the references to see if from the combined disclosures of all of them a person skilled in the art might readily have designed the device alleged by the plaintiffs to constitute invention.

Mr Fishleigh called as an expert by the defendants made a comparison of the non-cited references with the patent in suit. We are unable to find from his testimony or any testimony in the record that one skilled in analogous art could have designed the device which is the subject of patent No. 1 from the combined disclosures of all the prior art to which reference is made. We find, therefore, that the patent is not invalid for lack of invention.

This view is strengthened by a letter (px 61, 899a) from Dr. W. D. Coolidge to Dr. Firestone, dated February 10, 1943. Dr. Coolidge was consultant in x-ray matters for General Electric Company and formerly a Vice-president and Director of Research of that company. He said, in part: "Stimulated by a Russian publication in this field several years ago, we had a try at this method but without getting results of practical value."

The invention of this patent is not anticipated by any of the prior art references, either those cited in the file wrapper or those not cited. Not one of these references contains all of the elements of the invention or its equivalents. *Allied Wheel Products v. Rude,* supra.

The trial judge found patent No. 1 valid (171 F. Supp. 901, 910-914) and our findings support that conclusion. His findings are certainly not clearly erroneous.

The defendants challenge the validity of claims numbered 7, 16, 19, 20, 25, 26, 29 and 32 of patent No. 2. Claim No. 7 was held invalid by the trial judge and is the subject of appeal in case number 13891.

Claims numbered 16, 25 and 29 involve the use of a heterodyne amplifier. It is charged that this amplifier is old and lacks invention over patent No. 1 and that it is anticipated by prior patents, Harrison No. 2,433,361 (dx K-12, 1069a) and Wiseman No. 2,491,540 (dx K-15, 1105a).

It is claimed that crystal damping which is described in claims 19 and 32 is old in the art and anticipated by the Sokolov 1935 Publication (dx K-36, 1199a), Round patent No. 1,732,029 (dx K-5, 1031a), Sawyer patent No. 2,-105,010 (dx E-14, 969a) and British patent No. 473,636 (dx E-29, 987a).

Claims 20 and 26 are directed to the operation of the heterodyne amplifier and the damped crystal in combina-

tion. It is claimed that there is no new coaction between the crystal and the amplifier, that both elements are old and that the claims are anticipated by prior art as shown in exhibits JJ and KK.

It is known that crystal damping was in use before Dr. Firestone's adaptation of it in patent No. 2 (Fishleigh 325a) and he concedes that the heterodyne amplifier was old in the art before he used it in this patent. The gist of Dr. Firestone's alleged invention in patent No. 2, as evidenced by the claims in suit, can be simply stated in his own language:

"I might say that heterodyne amplifiers were used before my invention both having frequencies lower than the signal frequency and those having frequencies higher than the signal frequency, but no one recognized this property of the heterodyne amplifier that it would recover its sensitivity more quickly after receiving a shock. *So I have taught that if one combines a heterodyne amplifier with a damped crystal,* damped in the particular manner that I have shown, *one can find flaws closer to the surface than by omitting such elements.*" (Emphasis added.) (104a), and

At pages 546 and 547a: "I concede right off that there have been used before my invention heterodyne amplifiers having intermediate frequencies higher than the signal frequency. But they were always used for announced purposes which were different than my purpose, and none of them taught what I discovered, that a heterodyne amplifier with such elevated intermediate frequency will recover its sensitivity after the initial shock more rapidly than will a straight amplifier, and Wiseman is one example of such an amplifier. And if there has not been such teaching in the past literature, one does not know enough to choose such an amplifier in the design of his apparatus. I was the

first to announce that such a heterodyne amplifier will recover its sensitivity more rapidly than a straight amplifier."

* * * * *

"The Claim 26 is based on Claim 25 and combines that particular kind of a heterodyne amplifier along with means for damping the free vibrations of said crystal. So you can fail to find a flaw that is close to the surface either because the amplifier you used did not recover fast enough or because the crystal was not adequately damp, *and the combination of those two enables you to find flaws which would otherwise be undetectable."* (Emphasis added.)

The trial judge found that patent No. 2 related to improvements of patent No. 1 in the following respects: 1. Damping of the transducer (crystal) (claims 19 and 32); 2. Amplification by use of a heterodyne amplifier (claims 16, 25 and 29); and 3. "The use of improved means for the application of a train of voltage oscillations to the sending crystal." (Claim 7 which was held invalid.)

Patent No. 2 was in the Patent Office for nearly four years (June 1942-April 1946) before it was allowed. The claims in suit, except No. 32, were rejected one or two times, primarily because the combination had been exhausted by the first patent. Before the claims were finally allowed, Dr. Firestone made oral argument to the patent examiner. This argument is not a part of the file wrapper record and we, therefore, do not know the nature of it or what effect it had in overcoming the objections of the patent office.

The utility of patent No. 2 lies in the claim of Dr. Firestone that he had invented a means of detecting flaws in metal closer to the surface—within one-half inch.

To substantiate his claim to patent No. 1, after it had been rejected by the patent office, Dr. Firestone wrote, on

January 16, 1941, to that office: "I teach how to determine the thickness of a piece of steel when it is even as thin as 1/16 inch and when the reflected wave train arrives 0.2 micro-seconds after the initial pulse." (913a.) It appears that this was a vital matter in allowing this patent.

On January 15, 1941, in a letter to Edwin D. Eaton, (px 53, 879-880a) he wrote: * * * "Our equipment has been speeded up to such a point that we can now measure the thickness of the parallel plate which you sent us 1/16 in. thick in which case the successive reflections arrive back at the sending point ½ micro-seconds apart. * * * This improved operation and high speed has been made possible by two improvements: first, the damping of the quartz crystal by the addition of a heavy layer of wax to its back side, and second, the construction of a new amplifier having very short time constants in all parts of its circuit."

In the early part of this opinion we sustained the trial court's finding that there was no misrepresentation by Dr. Firestone in claiming that he could measure the thickness of metal down to 1/16 of an inch.

The trial judge discussed at great length prior patents and whether they anticipated the alleged invention of patent No. 2. The more important question is whether or not there was invention over patent No. 1. Counsel for plaintiffs claim that a new and unobvious result was achieved by the patent. Was the result unobvious or was it mere refinement such as any one skilled in the art might develop from the disclosures of the first patent?

In *Riddell, Inc. v. Goldsmith Sons Co.*, 92 F. 2d 353, 356, C. A. 6, the Court said: "The most that can be said for the claim is that, being skilled in an art continually undergoing refinement, he probably produced a better football shoe, but the improvement, if any, was in degree only and was not invention. * * * We think the claim represents

nothing more than the exercise of mechanical skill such as might have been expected and falls within the second rule announced in *Hug v. Lakewood Eng. Co.*, 7 F. 2d 98, 99 (C. C. A. 6)."

The rule referred to is: "In the other class he finds most of the elements already in combination, and adds one or two already well known, singly or as groups, as common expedients in similar situations, or he substitutes for one or two of those elements devices already familiar to mechanics for analogous use; here must be a very meritorious case of benefit to the art in order to justify a patent."

In *Dunbar v. Myers*, 94 U. S. 187, 199, the Court citing *Smith v. Nichols*, 88 U. S. 112, said: "Meritorious inventors are entitled to protection, but it is settled law that a mere carrying forward of an original patented conception, involving only change of form, proportions, or degree, or the substitution of equivalents, doing the same thing as the original invention by substantially the same means, is not such an invention as will sustain a patent, even though the changes of the kind may produce better results."

"A new application of an old device may not be patented if the 'result claimed as new is the same in character as the original result' (*Blake v. San Francisco*, 113 U. S. 679, 683), even though the new result had not before been contemplated." *Cuno Corp. v. Automatic Devices Corp.*, 314 U. S. 84, 91 and cases cited.

Here the claims in suit involve a heterodyne amplifier which is old, damping of the crystal which was previously known and a combination of the two which resulted in detecting flaws closer to the surface than could be done with patent No. 1. The parts performed the same function and operated in the same way as they did in the original patent. The difference in result was one of degree. It was only a refinement such as one skilled in the art could have

achieved from the disclosures of the first patent. This is not invention.

The questions arise from Dr. Firestone's own testimony whether he even achieved any new result. He says the minimum dimension that could be measured by the first patent was 1/16 of an inch. In detection of flaws he said: "Approximately a half an inch, or inch, perhaps." (186a.)

In the specifications of patent No. 2, page 3, first column, line 22, it is stated: "With my device the first reflection from a flaw one-half of an inch away may be observed, and successive reflections obtained in a plate one-sixteenth of an inch thick."

And on page 4, at line 11, second column, he says, "unusually good results are obtained in detecting flaws in parts of the order of magnitude of an inch in linear dimension, or in detecting flaws which lie within one-half of an inch of the sending point and from which the reflected wave train is received four micro-seconds after the initial wave train is sent out."

For the reasons herein stated, we find that claims 16, 19, 20, 25, 26, 29 and 32 are invalid for lack of invention over patent No. 1. Arriving at this conclusion it is not necessary to discuss anticipation by prior art.

There are three claims in patent No. 3 and the defendants challenge the validity of all of them on the ground that they are anticipated by prior art.

This is an improvement patent and the gist of it, as shown by the evidence and the specifications of the patent, is well stated by appellees in their brief, at p. 51, "the interposition between the means of transmitting supersonic wave trains (the crystal) and the workpiece of means capable of conducting the wave trains and having a dimension in the direction of wave train travel such that the

reflected wave trains are received after the transmission of the wave trains is completed. It is the interposition of delay means of these *dimensions* which secures the advantage of the patent, namely the ability to detect flaws immediately below the surface of the workpiece."

The trial judge discussed the alleged applicable prior art devices and found that none of them anticipated the patent in suit. (171 F. Supp. 901, 919.) Having in mind the rule of anticipation as we have heretofore stated it, we conclude that the trial judge was correct in his findings and that they are not clearly erroneous.

Here as in the case of patent No. 2 the pertinent question is one of invention over patent No. 1. In his opinion, the trial judge said: "The title of patent, (Supersonic Inspection for flaws lying near the surface of a part,) indicates in large part its purposes." All three of these patents have for their purpose, supersonic inspection of a workpiece to detect flaws through the use of wave trains. It is claimed by Dr. Firestone that No. 2 was capable of detecting flaws closer to the surface than was possible with No. 1 and that with No. 3 still better results in this respect were achieved.

The principal distinguishing feature between patents No. 3 and No. 1 is that a piece of metal of undisclosed size and shape, or a tank of undisclosed size containing a liquid of undisclosed content is placed between the crystal and the workpiece in patent No. 3. The same combination of elements as is used in patent No. 1 is used in this patent with the addition of the interposed member. It operates by the same fundamental principle. It produces a refinement of the same result. The question then arises as to whether or not this is invention. Would the adding of this element between the crystal and the workpiece be obvious to one ordinarily skilled in the art?

Looking backward it seems that this advance was a logical step and that it was so simple that it would have been obvious to any artisan. That was the patent examiner's first impression and he rejected the claims for that reason.

In an application for reconsideration, it was pointed out that seven instruments made in accordance with patent No. 1 were sold to large industrial companies; that they were sold subject to the limitation that testing cannot be performed closer than ½ inch to the surface of the object under test. Although these machines were operated by highly skilled research men, under the direction of skilled research directors, the problem had not been solved before Dr. Firestone's disclosure in patent No. 3. These men had long been aware of the problem and were eager for a solution, as detecting flaws closer to the surface was a matter of great importance.

Upon these representations the examiner allowed the three claims of the patent now in suit. There is some evidence by Mr. Fishleigh (p. 390a-391a) that the advance was an obvious one to one skilled in the art. There is no evidence contradictory to the representations in the application for reconsideration. "It is often difficult to determine whether a given improvement is a mere mechanical advance, or the result of the exercise of the creative faculty amounting to a meritorious invention. The fact that the invention seems simple after it is made does not determine the question; if this were the rule many of the most beneficial patents would be stricken down. It may be safely said that if those skilled in the mechanical arts are working in a given field and have failed after repeated efforts to discover a certain new and useful improvement, that he who first makes the discovery has done more than make the obvious improvement which would suggest itself to a

mechanic skilled in the art, and is entitled to protection as an inventor." *Expanded Metal Co. v. Bradford*, 214 U. S. 366, 381. See also: *Dow Chemical Co. v. Halliburton Oil Well Cementing Co.*, 324 U. S. 320, 330; *Loom Company v. Higgins*, 105 U. S. 580, 591; *Cold Metal Process Company v. Republic Steel Corp.*, 233 F. 2d 828, 837, C. A. 6, cert. denied, 352 U. S. 891, rehearing denied, 352 U. S. 955; and *G. H. Packwood Mfg. Co. v. St. Louis Janitor Supply Co.*, 115 F. 2d 958, 964, C. A. 8.

We find that there is not sufficient evidence of lack of invention to overcome the presumption of validity. Accordingly, we conclude that all claims of patent No. 3 are valid.

Patent No. 4 is a method patent. The purpose of claim 2, which is in suit, is for the inspection of the interior of a solid part and the detection of flaws therein. This claim describes a method adapted to the use and operation of the device covered by patent No. 1 and serves the useful purpose of being able to inspect a larger area of the workpiece without moving it, and of detecting flaws not otherwise ascertainable. There is no change in the fundamental principle of detecting flaws, as taught by patent No. 1. It is particularly adaptable for the inspection of a piece that is attached to a piece of machinery or other object.

The method of operation is pretty well described by the language of the claim: "The method of inspecting the interior of a solid part, which consists in transmitting a supersonic wave through a liquid which is in contact with the solid part, varying the angle of incidence of the wave for scanning a cross-sectional area of the solid part, and detecting waves emerging from the solid part into said liquid with an angle of emergence equal to the aforementioned angle of incidence." Varying the angle of incidence

is accomplished by a device which permits the crystal to be tilted or slanted.

The defendants charge that claim 2 is invalid because it is anticipated by Gotz, a prior art reference disclosed in a German publication "Akustishe Zeitschrift" (dx K-42, 1229a), and because it lacks invention.

The trial judge made findings by which he distinguished between the disclosures of Gotz and claim 2 of the patent now before us. He found that there was no anticipation. We agree with his conclusions and find that they are not clearly erroneous.

We might say further that the Gotz reference discloses that the author was transmitting sound waves *through* his workpiece at an angle and measuring the *intensity* of the received sound, rather than measuring the *time interval* between the sending of a wave train and the reception of a wave train reflected from a flaw or discontinuity. There is a basic difference. "A foreign patent is to be measured as anticipatory, not by what might have been made out of it, but by what is clearly and definitely expressed in it. An American patent is not anticipated by a prior foreign patent, unless the latter exhibits the invention in such full, clear, and exact terms as to enable any person skilled in the art to practice it without the necessity of making experiments." (*Carson v. American Smelting & Refining Co.*, 4 F. 2d 463, 465, C. A. 9, cert. denied, 269 U. S. 555. See also: *Borg-Warner Corp. v. Mall Tool Co.*, 220 F. 2d 803, C. A. 7.)

We find claim 2 of patent 4 is not anticipated by Gotz.

The patent office allowed the patent after first rejecting it because of lack of invention over patent No. 1. The method described by the claim in suit is novel and useful and we think is properly classed as invention. The trial

judge so found and we cannot say that such finding is clearly erroneous. Neither can we find sufficient evidence of lack of invention to overcome the presumption of validity.

We find the claim in question to be valid.

We have been considering, under the first six questions of defendants' brief, the validity of the claims in suit of patents numbered 1, 2, 3 and 4. Questions eight and nine still further challenge the validity of patent No. 1.

It is charged that the trial judge was strongly influenced to find patent No. 1 valid by reason of a letter dated February 10, 1943 (px 61, 899a), of W. D. Coolidge, then Vice-president and Director of Research of General Electric Company, to Dr. Firestone. We have previously referred to that letter and quoted the second paragraph to which the objection was directed. The defendants claim that this letter is hearsay and not admissible.

Dr. Coolidge was Director of Research of General Electric at the time he wrote the letter and had two or three hundred men under him. He was eighty-three years old at the time his deposition was taken in 1957 and had been retired since 1944. He had no present recollection of the subject discussed in the letter but he identified it as having been written by him and was certain that it stated a fact as of the time it was written. The letter is simply a memorandum recording a situation as of fourteen years before. The case was being tried to the court and the trial judge has considerable discretion as to what evidence shall be admitted. The Federal Rules and practice favor admission of evidence rather than exclusion if the proffered evidence has any probative value at all. We think the letter was admissible for what it appeared to be and that the question was one of weight rather than admissibility.

We do not find that the trial judge attached undue weight to the letter. He did not find that it was determinative of the issue of validity of patent No. 1, nor do we. It was cumulative and after finding validity it added strength to the conclusion. The fact that others had not achieved a result or made a discovery is only a circumstance in determining invention.

The claim that the trial judge based his finding of validity of patent No. 1 on commercial success is without foundation. We do not find anything in the opinion that would indicate he made such a finding, nor have counsel for the defendants referred any such findings to us. Only in close cases where there is some doubt about invention will commercial success tip the scales in favor of validity. If invention is lacking in a device no amount of commercial success will validate a patent. *Jungersen v. Ostby and Barton Co.*, 335 U. S. 560, 567; *Goodyear Co. v. Ray-O-Vac Co.*, 321 U. S. 275, 279; *Great Atlantic and Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U. S. 147, 153.

The trial judge did not find that invention was such a close question that it was necessary to rely on commercial success to sustain validity.

The defendants charge that the trial judge refused to recognize the fundamental rule that a device does not infringe where it follows the prior art rather than the patent disclosures. It is obvious that there can be no infringement in this case unless the accused device, the Immerscope, follows the teachings of the claims in suit of patents numbered 1, 3 and 4.

The trial judge painstakingly compared all of the alleged prior art references with the claims in suit of the patents herein involved. He found there was no anticipation. We sustain him in his findings as to patents 1, 3 and

4. As already stated we find patent No. 2 invalid for lack of invention.

The pertinent question here is whether the Immerscope follows the teachings of plaintiffs' patents. If its source is not in any one or more of these patents, it matters not where else it may be.

An infringement said the court in *Westinghouse v. Boyden Power Brake Co.*, 170 U. S. 537, 569, quoting from *Burr v. Duryee*, 1 Wall. 531, 573, "is a copy of the thing described in the specification of the patentee, either without variation, or with such variations as are consistent with its being in substance the same thing. If the invention of the patentee be a machine, it will be infringed by a machine which incorporates in its structure and operation the substance of the invention; that is, by an arrangement of mechanism which performs the same service or produces the same effect in the same way, or substantially the same way . . . That two machines produce the same effect will not justify the assertion that they are substantially the same, or that the devices used are, therefore, mere equivalents for those of the other."

"Infringement of a combination patent occurs only through a combination comprising every one of its elements or a mechanical equivalent." *Guide v. Desperak*, 249 F. 2d 145, 147, C. A. 2. See also: *Rowell v. Lindsay*, 113 U. S. 97, 102; *Imhaeuser v. Burek*, 101 U. S. 647.

"It is well established that an improver cannot appropriate the basic patent of another and that the improver without a license is an infringer and may be sued as such." *Tempco Co. v. Apco Co.*, 275 U. S. 319, 328. See also: *Cochrane v. Deener*, 94 U. S. 780, 787; *Cantrell v. Wallick*, 117 U. S. 689, 694; *C. and O. Ry. Co. v. Kaltenbach et al.*, 95 F. 2d 801, 804, C. A. 4.

"If the infringing device performs the same function as the patented device, it is immaterial that it also performs some other function. It is still none the less an equivalent of the patented device, and an appropriation of the patented invention." *Comptograph Co. v. Mechanical Account Co.*, 145 F. 331, 338, C. A. 1. See also: *C. and O. Ry. Co. v. Kaltenbach*, supra, and cases there cited.

As said by the trial judge, an accused device cannot escape infringement by merely adding features, if it otherwise adopts the basic features of the patent. *Holland v. American Steel Foundries*, 190 F. 2d 37, C. A. 7; cert. denied, 342 U. S. 859; *Aluminum Co. v. Thompson*, 122 F. 2d 796, C. A. 6; *Kelley-Koett v. McEuen*, 130 F. 2d 488. C. A. 6, cert. denied, 318 U. S. 762.

With these principles in mind, we proceed to analyze the Immerscope with reference to infringement of the Firestone patents.

The Immerscope consists of the following *essential* elements or component parts: A device consisting of a free running multivibrator, blocking oscillator and thyratron pulser, which serve to pulse the crystal; a piezoelectric quartz crystal to which the pulse is applied causing it to vibrate, and which is connected to the workpiece by immersing both in liquid, usually water, or putting a stream of water between them so that sound is conducted from crystal to workpiece; an amplifier-rectifier combination which serves to amplify small voltages and rectify individual oscillations received from the crystal, a linear sweep circuit synchronized with the multivibrator of the pulsing apparatus consisting of a bootstrap sweep generator and horizontal amplifier, which causes a trace to sweep horizontally across the cathode ray tube at a constant speed, as each pulse is emitted; and a cathode ray tube or oscilloscope.

In addition to the above essential elements the Immerscope has apparatus for delaying the synchronization to allow the operator to select what he views on the oscilloscope; an audio or visual flaw alarm, a sensitivity time control to amplify later returning weaker echoes; and a marking system that produces pips at regular time intervals on the oscilloscope screen adjacent to echo pips for a time measuring yardstick.

The Immerscope's crystal pulsing apparatus sends a pulse of electricity to the crystal and causes it to vibrate in the same manner as the wave train generator of patent No. 1. Although the component parts of the wave train generator and the pulsing apparatus have different names, their total effect is the same.

Both devices use a piezoelectric quartz crystal that is caused to vibrate when it receives a pulse of electricity. These crystals are substantially identical. The Immerscope uses one such crystal for both a sender and receiver while the device of patent No. 1 may use one or two.

Firestone uses a thin film of oil or wax between his crystal and workpiece to conduct sound waves from one to the other. The Immerscope uses a column of sound conducting liquid, usually water, between them, obtained by immersing both the crystal and workpiece in liquid or running a stream between them.

The Immerscope has an amplifier-rectifier combination which amplifies weak electrical currents received from the crystal and rectifies individual oscillations so that only their voltage envelope is shown on the oscilloscope screen. Firestone's patented device calls for an amplifier and a rectifier to be used for the same purposes, although his rectifier is optional.

Both devices have a linear sweep circuit synchronized with the emission of pulses or wave trains that cause a

trace to travel at a constant speed across the oscilloscope screen.

The Immerscope and the patented device utilize a cathode ray tube or an oscilloscope as an indicating device.

Defendants urge that the Immerscope can be distinguished from Firestone patent No. 1 by the type of testing done by each. It is claimed that the Firestone patent is limited to contact testing whereas the Immerscope is used in immersion testing and that difference is sufficient to avoid infringement. The District Judge discussed this distinction at length and found that at most the Immerscope was an improvement over the Firestone patent and that there was infringement. We are in accord with his findings and conclude that they are not clearly erroneous.

Upon a careful analysis of the elements and functioning of the Immerscope and Firestone patent No. 1, we conclude that the Immerscope operates in substantially the same way and uses substantially the same means as that which forms the substance of the Firestone invention.

Accordingly, we sustain the District Court's finding that claims numbered 2, 3, 4, 10 and 11 of patent No. 1 are infringed.

No. 2 patent is invalid for lack of invention over the disclosures of No. 1. Its alleged improvements over patent No. 1 were obvious to one skilled in the art. Therefore, No. 2 adds nothing to the disclosures of patent No. 1.

There seems to be little question that the Immerscope infringes all of the claims of patent No. 3. The defendants virtually admit this in their argument on the validity of the claims of patent No. 3 (Defendants' brief p. 40). We are in accord with the findings and conclusions of the trial judge on this question. The claims of patent No. 3 are infringed by the Immerscope.

The evidence supports the reasoning and conclusions of the trial judge on the question of infringement of claim 2 of patent No. 4. His findings are not clearly erroneous and for the reasons stated by him we conclude that the Immerscope infringes claim 2 of patent No. 4.

This case presents substantial questions on the validity of the patents in suit. There is very little question about the infringement of the accused device. Electro Circuits, Inc. sought a license from Sperry in order that it might manufacture its Wide Band Converter. This request for a license was refused but Sperry entered into a contract with Electro Circuits whereby it could use the Sperry patents in its Wide Band Converter under certain conditions or restrictions. These conditions or restrictions will be discussed later. Electro Circuits continued under the belief that it was necessary to have consent to use the disclosures of the Firestone patents until it was advised by counsel that they were invalid. Upon receiving this advice it began making the Immerscope, the accused device without restriction.

By some process of reasoning, the defendants now argue that the overall system of Sperry in the use of its foreign patents somehow relate to the use of its domestic patents, which results in such a misuse of those patents that they cannot be enforced. No pertinent authorities are cited in support of this alleged principle. Neither is there any reference to it in the Statement of Facts in the defendants' brief.

Counsel for the defendants approach this phase of the case in their brief as though this Court was hearing and determining the questions raised de novo. We address our attention only to alleged errors of the trial court.

Foreign patents grant no monopolies in the United States, nor do United States patents grant any monopolies in foreign countries. A patent is granted by a sovereign

power and its rights, privileges and obligations begin and end with the country that issues it.

The trial judge found that there was no misuse of the patents in suit as a result of Sperry's licensing and cross-licensing of foreign patents. There is ample evidence to support this finding and it is not clearly erroneous. We agree with the finding and the law as applied to it by the trial judge.

Another claim of the defendants is that Sperry imposed a "tying" agreement upon Electro Circuits, and that this agreement is illegal and constitutes a misuse of the Sperry patents and it is a violation of the anti-trust laws. In this connection, the trial court made findings, as follows: "Electro Circuits was organized in California in 1951. It commenced active operations in that state in July 1951. Its first development was a weld inspection apparatus which was followed by the development of a Wide Band Converter and the Immerscope. These devices operate on the principle of the pulse echo method of ultrasonic testing. At the time of its first development Electro Circuits attempted to secure a license under the Sperry patents in return for its agreement to purchase from Sperry unpatented subassemblies of the latter's patented devices. Sperry rejected this proposal. When Electro Circuits was ready to market its Wide Band Converter, Richards, the president of that company, had a conference with the officials of Sperry with a view of securing an agreement that would permit Electro Circuits to manufacture and sell its Wide Band Converter without being sued for infringement . . . It was agreed between the parties, however, that Sperry would forbear instituting suit for infringement provided Electro Circuits sold its Wide Band Converter for use only in conjunction with Sperry's Reflectoscopes. The Wide Band Converter was designed so that it could be 'plugged in' to a Reflectoscope. Under this arrangement of joint use,

only the display portion of the cathode ray oscilloscope of Sperry's instrument was used. All other functions of the dual apparatus were performed by the Wide Band Converter. The agreement remained in effect for about 9 months, during which time Electro Circuits sold 8 Wide Band Converters to owners of Reflectoscopes and one Wide Band Converter to a customer who agreed to its use with a Reflectoscope to be purchased from Sperry."

This agreement does not provide for the sale of any article covered by the patents in suit. Obviously then it does not provide that some other article either patented or unpatented must be purchased in order to get an article covered by the patents in suit. The agreement permits Electro Circuits to market its Wide Band Converter without being subjected to a suit for infringement. At this point, the parties to the agreement assumed that the Wide Band Converter infringed the Sperry patents. This being so, Sperry could have prevented the sale of the converters or could have sued the users for infringement. Sperry was legally entitled to be free of competition in the use of its patents. Under the agreement, no trade was unlawfully restrained. An article was thus introduced into commerce that might otherwise have been withheld from the markets.

There is no tying agreement here as that term has been defined by the courts.

"For our purposes a tying arrangement may be defined as an agreement by a party to sell one product, but only on the condition that the buyer also purchases a different (or tied) product, or at least agrees that he will not purchase that product from any other supplier. Where such conditions are successfully exacted competition on the merits with respect to the tied product is inevitably curbed." *Northern Pac. R. Co. v. United States*, 356 U. S. 1, 5.

The evil of tying agreements is the suppressing of competition. "Tying agreements by which the sale of one commodity is conditioned on the purchase of another have been repeatedly condemned under the antitrust laws, since they serve no purpose beyond the suppression of competition." *Black v. Magnolia Liquor Co.*, 355 U. S. 24, 25.

To be free of competition on the article patented is the very basis of the grant of a patent. In the agreement Sperry did no more than protect its fundamental and basic rights under its patents.

We conclude that the trial judge was not in error in finding that the agreement in question was neither a violation of the anti-trust laws nor a misuse of the patents in suit.

Another question presented by the defendants in their briefs concerns an alleged imposition by Sperry of restrictions on the use of its patented Reflectoscope after sale or lease. The argument addressed to this question relates to an Angle Beam Search Unit not covered by any of the patents in suit.

The evidence discloses that the Reflectoscope which is the subject of the patents in suit was sold outright without restriction. Approximately eleven hundred were so sold.

The Angle Beam Search Unit might be termed an accessory to the Reflectoscope, a device that might be used with it but not essential to the use of the Reflectoscope.

Until January 16, 1956 this device was leased and not sold. A condition of the lease was as follows: "1. Use. To be used for inspecting lessee's manufactured products, materials used therein, production equipment, and in the case of railroads, for the inspection of its rolling stock and components pertaining thereto." (dx RRRR, 1403a.) As of the above date all units were sold outright without restrictions.

There is no reference to any evidence, nor do we find any that would indicate that the patents in suit were in any way used to enforce restrictions on the use of the Angle Beam Search Units.

The patents in suit, therefore, were not misused or used in violation of the anti-trust laws. It is unnecessary to pursue further the restrictive condition of the lease of the Angle Beam Units. We are in accord with the conclusion reached by the trial judge.

We find no merit in the claim of defendants that the patents in suit were misused by placing on the patent tag of Reflectoscopes other patent numbers in addition to those in suit, under the words "Manufactured under one or more of the following patents."

The evidence does not show that the defendants or anyone else was injured by this listing of patents. It does not disclose that Sperry acquired any monopoly beyond what it was entitled to have under its patents. The patents in suit were properly listed on the patent tag.

The findings and conclusions of the trial judge on this question were correct.

The trial judge found that the defendants failed to sustain their claims of misuse and violation of the anti-trust laws. We have sustained him in these findings. It follows therefore that he was correct in dismissing the counter claim of the defendant Electro Circuits, Inc.

The judgment of the District Court will be affirmed, except as to its judgment finding claims numbered 16, 19, 20, 25, 26, 29 and 32 of patent No. 2 valid and infringed.

The judgment of the District Court as to claims numbered 16, 19, 20, 25, 26, 29 and 32 of patent No. 2 is reversed. The case is remanded to the District Court with instructions to enter a judgment on the above numbered claims of patent No. 2 in accordance with this opinion.

JUDGMENT.

November 22, 1960.

APPEAL from the United States District Court for the Northern District of Ohio.

THIS CAUSE came on to be heard on the transcript of the record from the United States District Court for the Northern District of Ohio, and was argued by counsel.

ON CONSIDERATION WHEREOF, It is now here ordered and adjudged by this Court that the judgment of the said District Court in this cause be and the same is hereby affirmed, except as to its judgment finding claims numbered 16, 19, 20, 25, 26, 29 and 32 of patent No. 2 valid and infringed.

The judgment of the District Court as to claims numbered 16, 19, 20, 25, 26, 29 and 32 of patent No. 2 is reversed. The case is remanded to the District Court with instructions to enter a judgment on the above numbered claims of patent No. 2 in accordance with the opinion herein.

Approved for entry:

/s/ LESTER L. CECIL,

United States Circuit Judge.

PETITION FOR REHEARING OF FLOYD A. FIRESTONE.

Floyd A. Firestone, one of the Appellees, respectfully petitions this Court to grant a rehearing as to the validity of claims 16, 19, 20, 25, 26, 29 and 32 of the Firestone patent in suit No. 2,398,701 (called patent No. 2).

This binder encloses a first section constituting the Petition for Rehearing, followed by a Brief supporting the conclusion that invention is a question of fact and followed by a Reference Addendum entitled "Unobviousness of the Patent No. 2 Invention Over the Patent No. 1 Invention."

JUSTIFICATION FOR FILING THIS PETITION WITHOUT JOINDER THEREIN BY SPERRY.

When this case was tried in the District Court, Petitioner appeared as his own counsel (68a). At that time Petitioner believed that he and his co-plaintiff Sperry Products, Inc. were equally interested in sustaining the validity and establishing the infringement of all four patents in suit. In the Court below Petitioner adopted the arguments made by Sperry's counsel. The other co-plaintiff, United Aircraft Corporation, was an involuntary party alleged to have certain rights in patent No. 2 (Complt., 5a) and was not represented by separate counsel at the trial or on the appeal.

The License Agreement of November 26, 1943 between Petitioner and Sperry (Exh. B to Complt., 7a) provides, besides other royalties, for the payment of annual minimum royalty payments (9a, 10a) and, in addition, that Sperry shall have the right to cancel the agreement at any time on 30 days' written notice (11a) in which event royalty payments from Sperry would cease and Petitioner's exclusive license in patent No. 2 in all fields

except aircraft would revert to him with right to sub-license others.

(An amendment of the original license agreement, entered into between Petitioner and Sperry on July 26, 1960 (not of record herein) has not changed Sperry's above right to cancel on 30 days' notice, except that such cancellation before the expiration of patent No. 2 on April 16, 1963 now requires the payment of a gradually diminishing cash penalty of approximately $31,000 unless both claims 19 and 32 are invalidated by a Court of last resort.)

On April 21, 1959, shortly after the notices of appeal had been filed in this case, Patent No. 1 expired.

This Court's decision of November 22, 1960 declaring invalid claims 16, 19, 20, 25, 26, 29 and 32 of Patent No. 2, taken with the expiration of Patent No. 1 pending the determination of the appeal, has altered to Petitioner's detriment the patent values which formerly underlay his agreement with Sperry. If this Court should adhere to that decision upon reconsideration thereof, then a situation will exist in which Sperry may find it to its interest to exercise its rights of cancellation of Petitioner's license agreement, which would prejudice Petitioner (210a).

Upon the basis of the facts hereinabove alleged Petitioner states his belief to be that he and Sperry do not, at this stage of the appellate proceedings in this action, have an equal interest in sustaining the validity of claims 16, 19, 20, 25, 26, 29 and 32 of Patent No. 2, and consequently are to that extent, but to that extent only, parties in adverse interest upon the question of the grant of a petition for rehearing upon those claims.

Petitioner therefore alleges himself to be entitled to ask this Court's reconsideration of its decision of November 22, 1960, without joinder herein by Sperry, on the

ground that the said decision will, if not corrected, produce injustice not only as between Petitioner and the Defendants-Appellants, but also as between Petitioner and Sperry Products, Inc., his co-Appellee.

GROUNDS FOR THIS PETITION.

The five grounds for this petition for rehearing and reconsideration arise from five points of procedure on which Petitioner respectfully submits this Court erred, and which are set forth hereinafter under Grounds 1, 2, 3, 4 and 5.

GROUND 1. Concerning Invention in the Superheterodyne Amplifier Claims 16, 25, 29 and 20, 26.

Since invention is a question of fact (Opinion, p. 7 bottom) and findings of fact of the trial Court in a Patent case cannot be set aside unless *clearly erroneous* (Opinion, p. 8 bottom), that is, no longer subject to debate, estimate or judgment, Petitioner respectfully submits that this Court, not having heard the four weeks of oral testimony and not having witnessed the demonstrations of both plaintiffs' and defendants' apparatus containing the patent No. 2 improvements (48b to 71b), erred (Opinion, pp. 13, 25) in finding the superheterodyne amplifier claims 16, 25, 29 and 20, 26 invalid for lack of invention over Patent No. 1 (Firestone Patent No. 2280226, Px. 1, 847a), when the District Court had said concerning this improvement (797a) "Thus, by the use of *imagination* and *inventive skill,* Firestone adapted an old device to a *new use* in a *different art* and achieved an *unobvious* and useful result" (emphasis supplied); furthermore, the District Court held these claims *valid* and infringed (812a, 843a) after having given special consideration to the reference effect of patent No. 1 (798a).

The ground on which this Court invalidated claims 16, 25, 29 and 20, 26 namely, lack of invention over Patent No. 1 in view of the fact that heterodyne amplifiers were old, was based upon findings of fact by this appellate court (Opin. p. 12)

> "The parts performed the same function and operated in the same way as they did in the original patent. The difference was one of degree. It was only a refinement such as one skilled in the art could have achieved from the disclosures of the first patent"

which are in direct conflict with findings as to the same facts by the trial court, and which are unaccompanied by any determination that, or any statement of this Court's reasons why, the trial court's findings were "clearly erroneous" as set forth in Rule 52(a) of the Federal Rules of Civil Procedure. While we do not dispute this Court's power to apply to facts properly found the standard of invention which the law lays down, we do assert an absence of power in this Court to determine disputed issues of fact in opposition to findings of fact of the trial court unless and until those findings have first been set aside upon a determination that, upon the evidence, they are "clearly erroneous."

The determination of just what the patentee did, whether a problem existed before he began his work, what steps he took to overcome the problem, what the art may have suggested to him, and whether his instrumentalities perform the same or different functions or operate in the same or different ways from those embodied in prior structures—are questions of fact susceptible of proof and findings of fact. This is especially true where, as here, these disputed issues were contested largely through conflicting oral testimony, and where neither documents nor depositions are directly involved.

The District Court expressly found that claims 16, 25 and 29 of Patent No. 2 are not anticipated by Patent No. 1 (798a).

The District Court expressly found that an ordinary amplifier (in the apparatus of Patent No. 1) remains blocked for a period of time after the wave train signal has gone out, thus preventing reception of echoes from nearby flaws (796a). It also found that Firestone solved this problem by the use of a heterodyne amplifier whose intermediate frequency was greater than the signal frequency (797a). The District Court also expressly found as follows (797a):

> "Firestone did more than merely recognize a feature or advantage of a heterodyne amplifier as used in the depth sounding art. He used the heterodyne amplifier in the different art of non-destructive testing by the new technique of the ultrasonic pulse echo method to effect the novel and useful result of enabling the receiver speedily to recover its sensitivity and reflect the echoes from flaws close to the surface of the piece under inspection. Thus, by the use of imagination and inventive skill, Firestone adapted an old device to a new use in a different art and achieved an unobvious and useful result."

There is credible oral evidence to support the foregoing findings. This evidence is summarized at pp. 42-44 and 48-49 of the Main Brief for Sperry Products, Inc. The trial court's refusal to accept Fishleigh's contrary testimony (at 339a ff) may have been due to the demeanor and admissions of this witness when cross-examined about *Wiseman* (175b-176b), or to that of Firestone when testifying in regard to the heterodyne at 72b, 78b and 206b-207b. Or in evaluating the experts the Judge may have weighed in the scales his own findings that damping is non-existent in *Hayes* and *Sokolov* against Fishleigh's

testimony that he found damping in each of them. In any case, what Firestone did and what others failed to do in this art are matters of fact, not law, and it was the trial judge, who observed these witnesses during a 4 weeks trial, who is in the best position to determine where the truth lies and what these facts are.

The documentary evidence does not show that the above-quoted finding of fact is "clearly erroneous." On the contrary, it tends to support it. The only prior art which Fishleigh's enlarged charts (Dfts. Exhs. GG, HH, II and KK) applied against claims 16, 25, 29 and 20, 26 was *Harrison, Wiseman* and *Langevin*. The first two of these show heterodyne amplifiers used in environments where there could have been no appreciation, since no use was made, of their then unknown capacity for extremely rapid recovery from high voltage shock. According to the findings of fact:

> *Harrison*, 2,433,361 (1069a), uses a long warbling note for underwater ranging at great distances. The findings show (795a-797a) that the quick recovery characteristic of his heterodyne amplifier was not called into play and could never have been observed under these conditions.
>
> *Wiseman*, 2,491,540 (1105a), shows a transmitter operating continuously (Fishleigh, 176b) for submarine detection at long range. The quick recovery characteristics of the heterodyne amplifier were not utilized and could not have been recognized under these conditions.
>
> *Langevin*, 1,858,931 (955a), was not claimed by Fishleigh to show a heterodyne amplifier. It was not mentioned in relevant sections of Defendants' Brief on this appeal (see pp. 34-39).

The District Court concluded (at 798a)

> "* * * There is nothing in the disclosures of the depth sounding devices of Harrison or Weisman [Wiseman]

that would teach a workman skilled in the art of non-destructive testing the solution of the problem (27) solved by Firestone * * *."

That the apparatus of Patent No. 2 was a significant improvement over the apparatus of Patent No. 1 is shown under Ground 4 below.

Accordingly, it is respectfully submitted that this Court has fallen into error in holding claims 16, 25, 29, and 20, 26 invalid, and rehearing is requested upon that issue.

GROUND 2. Concerning Invention in the Added Echo-Free Damping Block Claims 19, 32 and 20.

Similarly, Petitioner respectfully submits that this Court erred in holding the added echo-free damping block claims 19, 32 and 20 invalid for lack of invention over patent No. 1 in the face of the following *facts* established by the District Court and not set aside by a determination of this Court that, upon the evidence, they are "clearly erroneous" (Emphasis supplied below):

a. "While Sokolov refers to the need of a 'damping decrement,' he *does not teach how* the damping is to be accomplished and, as hereinbefore noted, a foreign reference is good only for what it clearly teaches." (739a.)

b. "Defendants also refer to the 'inertia member' of the Hayes patent, No. 2424030. However, this is a *tuning member* and it has *not* been shown that it was designed as a means of damping." (793a.)

c. "Defendants' *chief* reliance is upon the Bond-Mason patent, No. 2427348. * * * These exhibits corroborate Dr. Firestone's testimony and are sufficient to *antedate* the reference." (793a.)

d. "The evidence demonstrates that in January and February of 1941 Dr. Firestone did know precisely what he was doing and that *his tests were successful.*" (794a.)

e. "The claims ((19 and 32)) in question disclose a damping *means* which 'absorb high frequency waves instead of transmitting them.' " (794a.)

f. "Claims 19 and 32 are not anticipated." (794a) This is a prerequisite to invention.

g. As to claims 20 (and 26), "These claims are for a combination of damping means and heterodyne amplifier. *As shown by the evidence*, the incorporation of these elements in the apparatus of Patent No. 2 *makes possible* the discovery of flaws located close to the surface of the part under inspection." (798a.)

h. "Defendants' argument that the combination is an old one is *not supported* by the references cited by them. *None* of such references shows the combination." (799a.)

i. "*Nor* can the inclusion of *both elements* in the device be considered as a mere *aggregation*." (799a.)

j. "Now therefore it is ordered, adjudged and decreed: 1. That said Opinion constitutes *Findings of Fact* and Conclusions of Law pursuant to rule 52(a), F. R. C. P. ____ 6. That claims 16, 19, 20, 25, 26, 29 and 32 of U. S. Patent No. 2,398,701 are *valid* and have been infringed by the defendants and by each of them * * *." (843a.) The conclusion of law that these claims are valid establishes the prerequisite *facts* that these claims possess novelty, utility (see Ground 4), and *invention*. (The failure of the District Court's Opinion to mention claim 19 in the summary paragraph on 812a appears to have been an oversight or printer's error; it is included in that Court's Order on Interlocutory Judgment on 843a.)

The District Court's conclusion of law that the claims 19, 32 and 20 (among others) are valid establishes the prerequisite *fact(s)* that these claims possess *invention* (as well as novelty and utility) and since invention is a question of fact (Opinion, p. 7 bottom), this finding of fact is not to be set aside by this Court except by a

determination that, upon the evidence, the District Court's finding of invention is "clearly erroneous." In this connection, attention is called to the Reference Addendum following this Petition and setting forth the "Unobviousness of the Patent No. 2 Invention Over the Patent No. 1 Invention." Attention is also called to the following Brief supporting the conclusion that invention is a question of fact.

In holding claims 19, 32 and 20 invalid for lack of invention over patent No. 1 assertedly because of "damping of the crystal which was previously known" (Opinion, pp. 9, 12) this Court apparently overlooked the important distinction between these claims and claim 26 only which includes *broadly* a "means associated therewith for damping the free vibrations of said crystal" and which is claimed only in combination (and coaction) with the very specific elements of claim 25. By contrast, claims 19, 32 and 20 include a very important and completely *novel means* of damping the crystal (196a) by radiating its energy of free vibration as a wave train into an added "means for effectively absorbing waves of the frequency of the waves radiated by said transducer" (claim 20, approximately claims 19, 32) described in the specification as being a "block of * * * material which absorbs high frequency waves instead of transmitting them" (p. 2, col. 2, line 28; p. 4, col. 2, line 39) "so that no reflection is received from the back face of the damping block" (echo-free damping block). Let us here reproduce from page 10 of this Court's Opinion a quotation from Firestone's testimony but change the supplied emphasis; "So I have taught that if one combines a heterodyne amplifier with a damped crystal, *damped in the particular manner that I have shown,* one can find flaws closer to the surface than by omitting such elements."

This Court obtained the impression that damping of a crystal was previously known (Opinion p. 9, bottom) from reading the *oral* testimony of Fishleigh (325a) concerning a chart (Dx T) prepared by him and purporting to show "Damping the Free Oscillations of a Crystal" but whose evidentiary value has now been completely destroyed by the contrary findings of fact of the District Court a, b and c above and as follows:

a. "While Sokolov refers to the need of a 'damping decrement,' he does not teach how the damping is to be accomplished and * * * a foreign reference is good only for what it clearly teaches." (793a.)

b. "Defendants also refer to the 'inertia member' of the Hayes patent, No. 2424030. However this is a *tuning member* and it has *not* been shown that it was designed as a means of damping." (793a.)

c. "Defendants' *chief* reliance is upon the Bond-Mason patent, No. 2427348. * * * These exhibits corroborate Dr. Firestone's testimony and are sufficient to *antedate* the reference." (793a.)

As to the three other references on the same chart:

Williams (1023a) has no crystal and is shown merely as an example of the use of damping in an electrical circuit. (327a, 153b.)

Pope's audio frequency device seems to have been *abandoned* by Defendants on this appeal for they neither printed the patent in their appendix nor mentioned it in their briefs.

Round (1031a) is an audio frequency device and has *no crystal*.

Thus Fishleigh's chart Dx T fails to show that any kind of damping of a crystal was previously known, not even that claimed broadly in Claim 26, let alone the specific kind of novel damping means claimed in 19, 32 and 20.

Further, Fishleigh's Chart Dx EE shows the two prior art items on which Defendants relied below against Claims 19 and 32. These are Hayes and Sokolov for each of which the District Court found the fact that they do not disclose any damping means at all. (a and b above.)

Also, Fishleigh's chart Dx KK presents the combination of two pieces of prior art, namely Hayes and Wiseman, on which pair Defendants relied against the claim 20 which covers the combination of the added echo-free damping block and the superheterodyne amplifier. There was no suggestion in either Hayes or Wiseman that they *should* be combined, the District Court found the facts that Hayes does not show a damping means (b above) and (798a) that there was nothing in Wiseman that would teach the solution of the problem solved by Firestone, and also found fact "h" above that none of the references cited by the Defendants shows the combination.

No testimony concerning either of the audio-frequency devices, Sawyer 2105010 or British 473636, appears in the printed appendices. Each of these, as Defendants admit (Brief, p. 3., footnote) had been cited in the Patent Office against the Firestone application for patent No. 2 and Claims 19, 20 and 32 had been found allowable over them even when taken in combination with the Firestone No. 1 patent.

The precise issue on which this Court declared Claims 19, 20 and 32 invalid—obvious combination of Patent No. 1 and crystal damping generally—was decided by the Patent Office (1280.20b) in favor of non-obviousness. The presumption of validity thus created has been overturned in this case, without supporting evidence and contrary to the findings of the District Court.

Accordingly, it is respectfully submitted that this Court has fallen into error in holding Claims 19, 32 and 20 invalid, and a rehearing is requested on that issue.

GROUND 3. Concerning Invention in the Combination Claim 26.

While Claim 26 includes *broadly* "a piezoelectric crystal having means associated therewith for damping the free vibrations of said crystal," it derives added novelty and invention from the very specific heterodyne amplifier Claim 25 on which it is dependent. The District Court found Claim 26 valid (843a) and therefore possessing invention. It also found fact "h" above that none of the references cited by the Defendants shows the combination, and fact "i" that the inclusion of both elements in the device is not a mere aggregation.

Accordingly, it is respectfully submitted that this Court has fallen into error in holding Claim 26 invalid and rehearing is requested on that issue.

GROUND 4. Concerning Utility of the Patent No. 2 Apparatus Over the Patent No. 1 Apparatus.

Though the lack of added utility of apparatus responding to Claims 16, 19, 20, 25, 26, 29 and 32 over Patent No. 1 Apparatus, was not an issue before this Court, had never been alleged by the defendants, is not an acceptable defense for one who infringes, is not a prerequisite to a valid patent which may have less utility than the prior art so long as it has *some* utility, and is inconsistent with the commercial success achieved both by Sperry Reflectoscopes which use Firestone's added echo-free damping block (claims 19, 32) and some of which also use his super-rapid recovery superheterodyne amplifier (all claims) and by defendants Immerscopes and B-scans all of which use both of these improvements (all claims, 843a), this Court on its own initiative appeared to deduce a lack of

added utility (Opinion, pp. 11, 12, 13) by intercomparing the 1/16 inch plate measurements which had at different times actually been made by patent No. 1 and by patent No. 2 apparatus respectively, thereby also making a scientific error of serious consequence in neglecting the fact that patent No. 1 apparatus measures 1/16 inch by using high frequency waves from 10 up to 50 megacycles (patent No. 1, p. 3, col. 1, line 32) while patent No. 2 apparatus can measurre 1/16 inch while using the lower frequency waves up to 5 megacycles (patent No. 2, p. 1, col. 2, line 53; p. 4, col. 2, line 4; p. 3, col. 1, line 23) thereby achieving the added utility which goes with lower frequency waves, namely, ability to detect flaws both near and far away at a single placement of a single crystal (75a, 76a, 185a, 186a, 188a, 189a, 44b) the lower frequency waves not being rapidly absorbed with distance as the high frequency waves are (76a, 593a, 594a, 453a), (a very important advantage in routine inspection), ability to detect flaws by contact inspection in pieces with rougher surfaces (152a, 153a), and ability to use thick rugged crystals less subject to breakage in contact testing (488a, 512a). The added utility of the patent No. 2 improvements may be utilized to find flaws still closer to the entering face of the part, assuming that the frequency, surface roughness, kind of material under test, etc., are kept constant as assumed in the specification of patent No. 2; or the added utility can be used up in securing the advantages of lower frequency waves in finding more distant flaws while keeping the ability to find close flaws constant, as in the example considered by this Court. In any comparative performance test of patents Nos. 1 and 2 apparatus, all variables such as frequency, surface roughness, kind of material under test, etc., must be kept constant except the addition of the

patent No. 2 improvements; this was not done in the tests cited by this Court, the frequencies being different and the materials being respectively steel (density 7.7) (145a) and aluminum (density 2.7) (752a), this being also the only metal specifically mentioned in patent No. 2 (p. 2, col. 1, line 24).

PROOF of the Added Utility of Patent No. 2 Apparatus Over the Patent No. 1 Apparatus. Plaintiffs' expert Firestone and defendants' expert Fishleigh AGREED (153a, 347a, 425a bottom) "that such damping means are *very advantageous*—are *advantageous* regardless of how the crystal is caused to vibrate." This is straightforward proof of the added utility of Firestone's added echo-free damping block. (Emphasis added.)

The District Court found that (798a) "Firestone was the inventor of Patent No. 1 and also invented *meritorious* improvements of his original device." (Emphasis supplied.)

The equivalence of the performance figures given at different times for Patents 1 and 2 apparatus was a coincidence and arose from following the conservative practice of rating the attainable performance as equal to the performance which had actually been observed in certain tests up to that time, no effort having been made to standardize conditions so as to make these tests be comparative.

GROUND 5. Utility versus Invention. Petitioner respectfully submits that it may be illogical to include alleged lack of added *utility* among the "reasons" for holding these claims invalid for lack of *invention*. (Opinion, pp. 13, 12, 11.)

NOVELTY. LACK OF ANTICIPATION BY THE PRIOR ART. INFRINGEMENT.

The District Court gave careful consideration to the prior art pertaining to the validity of these claims in question (792a to 799a) and to their infringement (807a, 808a, 811a, 812a). Petitioner agrees with the District Court's conclusions (843a, 812a) that all of these claims are valid and infringed and also agrees with that Court's findings of fact upon which those conclusions are based.

CONCLUSION OF PETITION.

In view of the five errors of procedure or science respectfully alleged above in Grounds 1, 2, 3, 4 and 5 Petitioner respectfully requests a rehearing as to claims 16, 19, 20, 25, 26, 29 and 32 only of patent No. 2 to the end that the Opinion of this Court dated November 22, 1960 may be modified to uphold the Opinion of the District Court holding these claims valid.

Respectfully submitted,

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Plaintiff-Appellee,
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Dobbs Ferry, New York,
Pro Se.

CERTIFICATE.

I hereby certify that the foregoing petition is presented in good faith and not for purposes of delay. The thirty day extension of time previously requested and kindly granted by this Court in order to enable Attorney W. Houston Kenyon to become sufficiently familiar with this complex case to prepare a Petition for Rehearing was requested in good faith and not for purposes of delay, but while Attorney Kenyon has assisted Petitioner in the preparation of part of this Petition, he has not been retained as counsel due to certain differences of opinion which have arisen between himself and Petitioner.

FLOYD A. FIRESTONE,
Pro Se.

BRIEF IN SUPPORT OF PETITION.

INVENTION IS A QUESTION OF FACT.

At page 7 of the Opinion this Court made reference to *Ohmer Fare Register Co. v. Ohmer*, 238 F. 182, 186 (C. A. 6th) wherein it was stated that the question of invention is one of fact. Accordingly it will not be necessary to cite additional authorities on such point.

In this Petition the factual items which have been found by the District Court from the conflicting testimony and from the evidence submitted at the trial have been set forth in detail and have been documented by reference to the record so that it is not necessary to repeat them here. It is sufficient only to state that the factual findings of this Court holding certain claims of the No. 2 patent to be invalid, contained errors of a scientific nature concerning matters which were considered at great length by the District Court in the light of the conflicting testimony of the experts. Such factual findings of the Trial Court in a patent case should not be set aside unless clearly erroneous. This Court followed that rule which appears at page 8 of the Opinion in holding Patent No. 1 to be valid. The same rule applies obviously to claims which have been held invalid in Patent No. 2 by this Court, but in view of the distinctions which have pointed out in the Petition it would appear as though this Court has overlooked the items of evidence which properly support the findings of fact of the District Court.

REFERENCE ADDENDUM.

INVENTION.

Unobviousness of the Patent No. 2 Invention Over the Patent No. 1 Invention.

Though the above five grounds are believed to be adequate to justify the granting of this petition, the following remarks supported by the record are set forth in support of the unobviousness of the patent No. 2 invention over the patent No. 1 invention.

This subject should be viewed, not with that clarity of 1960 hindsight which comes from a reading of the patent No. 2 specification which has already analyzed the causes of difficulty and set forth their remedies, but should rather be viewed in the light of the state of knowledge of Firestone himself, the one most skilled in this art (791a) at the time when he wrote his specification for patent No. 1 (application May 27, 1940) which this Court has held as negating invention in patent No. 2. The problem of finding flaws still closer to the entering face did not appear to have any obvious solution at that time and progress in the laboratory experiments was slow (44b) because as we now know in retrospect, the difficulty was a puzzling mixture of seven coacting causes which it now requires more than column 2 of page 2 of patent No. 2 to outline. The finding of the seven causes was half the battle and required an experimental program of many months duration supported by the United Aircraft Corporation (879a).

Though Firestone testified (101a) that he did not invent damping generally and used to expound it to his students before he made the invention covered by patent No. 2, nevertheless it was not obvious to him at the time when he wrote his patent No. 1 specification that damping

should be used. The use of damping has its own problems such as cutting down the sensitivity of the crystal both as a sending and as a receiving device, or the introduction of spurious echo indications from within the damping device (101a). For finding small flaws far away in parts with a very smooth surface it is actually better not to use any damping (102a, 103a, 152a, 153a). The drawings of patent No. 1 show that Firestone taught the use of no damping on his crystals other than that which is provided by the radiation of the wave energy into the part itself, which yields a very considerable amount of damping if the surface of the part is smooth so that the crystal makes good effective contact with it (152a); neither does the written specification mention any damping means.

Furthermore, Firestone gave specific consideration in his patent No. 1 specification to the types of amplifier which would be satisfactory, mentioning both the wide band amplifier and the tuned radio frequency amplifier (patent No. 1, p. 2, col. 1, lines 46-50) but though he certainly knew of the existence of the superheterodyne amplifier it was not obvious to him that it had any special utility for this use and he did not mention it.

By January 10, 1941 (883a, 884a) Firestone had recognized not only that damping of the crystal was advantageous in finding flaws close to the surface at a given frequency but had also invented a novel means of achieving the damping without producing spurious echo indications by affixing to the crystal an additional member into which a second wave train was radiated at the same instant that the primary wave train was radiated into the part under test, echoes from within the damping block itself being avoided by casting it of a sound attenuating material. This type of damping which utilizes an added

echo-free damping block to swallow up a wave train is new in any art (101a, 102a, 103a, 196a), "a very *important* part of my overall invention" (102a), and fully justifies the validation of the very valuable claims 19 and 32 as well as the combination claim 20. This added echo-free damping block permanently affixed to the crystal makes up a "search unit" which can be moved over the smooth or rough surface of the part under test and will still be adequately damped for finding flaws close to the surface (152a).

It was many months later before it was conceived (756a) that the superheterodyne amplifier would have special utility in super-rapid recovery from blocking (patent No. 2; p. 2, col. 2, lines 43-58; p. 4, col. 1, line 33 to col. 2, line 10), and its full virtues were only demonstrable because the free vibration of the crystal had already been adequately controlled by the added echo-free damping block (COACTION in the experiments directed to a common purpose). (Though the District Court pointed out (799a) that coaction of the parts is not necessary if they answer a single purpose, there is additionally coaction between the added echo-free damping block and the superheterodyne amplifier in that, *simultaneously* shocked by an initial impulse from the *same* voltage train generator, both crystal and amplifier recover their echo detecting capabilities during the *same* microseconds time interval immediately following that initial pulse, the crystal recovering its state of rest in microseconds by radiating its energy of free vibration into the added echo-free damping block never to return (patent No. 2, p. 2, col. 2, lines 26-42; p. 4, col 2, lines 32-40), while the smaller condensers which a superheterodyne amplifier has (p. 4, col. 2, lines 59-65) can discharge in the *same* microseconds interval through their grid leaks and coils, with the *single purpose* that the

entire system starts actively listening for echoes microseconds after the initial pulse, thereby indicating an echo from a flaw as close as roughly ½ inch away. This lends added support to the combination claim 20.)

Thus Firestone's actual experience as the one most skilled in this art (791a) at the date of the patent No. 1 application, is direct experimental evidence from the record that the inventions covered by the seven patent No. 2 claims in question were not obvious to one skilled in the art who had full knowledge of patent No. 1.

The defendants have applauded the inventive step taken by Firestone in going from patent No. 1 to patent No. 2 which issued in 1946, by designing their Immerscope and B-scan in 1949 (889a) to infringe *all* of the asserted claims of patent No. 2 in great detail even though it involved the risk of a lawsuit.

Furthermore, no plaintiffs' Reflectoscope, or defendants' Immerscope or B-scan (807a, 808a) has ever been sold except for use with Firestone's added echo-free damping block. Defendants gave this fact much emphasis in their appeal brief (pp. 4, 13, 55) in an attempt to invalidate patent No. 1 by showing lack of commercial success of *it*. Since it is established by the District Court (783a, 791a) and by defendants' own witnesses (468a, 599a) that the pulse echo method of testing has been a commercial success and has filled a long felt need, and since the defendants have urged that this commercial success was not due to patent No. 1, there is no evidence to counteract Firestone's testimony concerning his echo-free damping block of patent No. 2 that "I consider it a very important part of my over-all invention" (196a, 102a) and that patent No. 2 "has its necessary, absolutely necessary function, when the flaws are close to the surface" (103a), so one may ascribe a considerable fraction of the commercial success

of the Reflectoscope and Immerscope to the added echo-free damping block of patent No. 2.

Respectfully submitted,

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Pro Se.

ORDER DENYING PETITION FOR REHEARING.

Before: MILLER, *Chief Judge*, MCALLISTER and CECIL, *Circuit Judges*.

Floyd A. Firestone, one of the Appellees herein, filed a petition for rehearing as to the validity of claims 16, 19, 20, 25, 26, 29 and 32 of Firestone patent in suit No. 2398701, sometimes referred to as patent No. 2.

This Court found that patent No. 2 ,was invalid for lack of invention. (Opinion reported at 285 F. 2d 911, 918-920.)

Upon consideration of the petition for rehearing, the opinion of the District Judge, reported at 171 F. Supp. 901, 914, his order on Interlocutory Judgment of February 10, 1959, the Findings and Conclusions stated therein, the briefs and appendices of counsel, and the opinion of this Court, *supra*.

We find that under the evidence the claims in question of patent No. 2 are clearly invalid for lack of invention. We further find that insofar as any findings of fact or inferences or conclusions from such findings of the trial judge are inconsistent with the conclusion of this Court, expressed in its opinion as to the validity of the above-numbered claims of patent No. 2, they are clearly erroneous.

It is therefore ordered and adjudged that the petition for rehearing be and it is hereby denied.

LESTER L. CECIL,
Circuit Judge.